

**Draft**

# **Phase 2 Remedial Investigation Health and Safety Plan**

**for the  
Diamond Head Oil Superfund  
Site  
Kearny, New Jersey**

**Prepared for:  
U.S. Environmental Protection Agency  
Region II  
290 Broadway, New York**

**Prepared by:**



**CH2MHILL**

**99 Cherry Hill Road  
Parsippany, New Jersey**

**Prepared under:  
Contract No. DACA87-02-  
D-0006  
Task Order No. DH02**

**August 2007**

299590



# **Revised**

## **CH2M HILL HEALTH AND SAFETY PLAN**

This Health and Safety Plan (HASP) will be kept on the site during field activities and will be reviewed as necessary. The plan will be amended or revised as project activities or conditions change or when supplemental information becomes available. The plan adopts, by reference, the Standards of Practice (SOPs) in the CH2M HILL *Corporate Health and Safety Program, Program and Training Manual*, as appropriate. In addition, this plan adopts procedures in the project Work Plan. The Site Safety Coordinator (SSC) is to be familiar with these SOPs and the contents of this plan. CH2M HILL's personnel and subcontractors must sign Attachment 1.

### **Project Information and Description**

<b>PROJECT NO:</b>	359471
<b>CLIENT:</b>	United States Army Corps of Engineers, Huntsville District & United States Environmental Protection Agency, Region II.
<b>PROJECT/SITE NAME:</b>	Diamond Head Oil Refinery
<b>SITE ADDRESS:</b>	VACANT LOT, adjacent to 1235 Harrison Avenue (Campbell Foundry), Kearney, New Jersey 07032 (Hudson Co.)
<b>CH2M HILL PROJECT MANAGER:</b>	Juliana Hess/NJO
<b>CH2M HILL OFFICE:</b>	99 Cherry Hill Road Suite# 200 Parsippany, NJ 07054
<b>DATE HASP PREPARED:</b>	05/17/2002
<b>DATE HASP REVISED:</b>	07/17/2007
<b>DATE(S) OF SITE WORK:</b>	08/31/2007 through 01/01/2008
<b>SITE ACCESS:</b>	Not Applicable
<b>SITE SIZE:</b>	15 acres
<b>SITE TOPOGRAPHY:</b>	Flat
<b>PREVAILING WEATHER:</b>	The moderate continental climate varies between average highs around 85° F in July to average lows near 23° F in January. The average amount of precipitation is 3.5 inches per month.
<b>SITE DESCRIPTION AND HISTORY:</b>	The site is a former oil refinery operation where dumping has occurred. Approximately 1/2 of the site (7 acres) is occupied by a landfill of construction and other miscellaneous debris. A geophysical survey has revealed no areas of buried drums. The other half of the site was occupied by tanks, a 5-acre oil lagoon and two buildings. The oil lagoon has been excavated and filled in and only the foundations of the building are currently present. Historic information suggests the presence of large LNAPL which CH2M Hill will attempt to delineate.

**DESCRIPTION OF SPECIFIC  
TASKS TO BE PERFORMED:**

The tasks involved in the Phase 2 Focused RI/FS will include the following:

- Soil investigation using a Geoprobe with Laser Induced Fluorescence (LIF).
- Abandoned landfill investigation consisting of linear trenching & test pits to observe contents of landfill.
- Trenching 30' for the installation of a pilot Air Sparge system.
- Operating pilot Air Sparge System.
- LNAPL Pumping /skimming recovery pilot test.
- Soil sample collection & shipment of hazardous samples to laboratories.
- Storage of hazardous waste in on-site 55 gallon drums.
- Waste storage of onsite non-hazardous soils.
- Confined space entry while cleaning 21k gallon frac tanks (by subcontractor).
- Construction of temporary roadways on site using bulldozer.
- Vegetation clearing by use of tractor/power sickle.
- Monitor airborne dust accumulation & control with water trucks and sprinklers.
- Wetlands work.

# CH2MHILL

## PROJECT CONTACTS LIST

This form shall be completed and updated as necessary by the Safety Coordinator. A copy of the completed form shall be posted in a prominent location onsite and/or attached to the CH2M HILL HSE plan.

Client: United States Environmental Protection Agency (Region II)

Project/Site Name: Diamond Head

Project Number: 359471

Project Contacts	Name	Phone Number	Cell Number
Client <b>*Contact to client shall only be made after contacting Project Manager</b>	Grisell Diaz-Cotto U.S. Environmental Protection Agency: Project Manager	212-637-4430	
CH2M Hill Project Manager	Juliana Hess/NJO	(973)316-9300 Ext. 4547	201-602-1557 (cell)  973-984-5734 (home)
CH2M HILL RI Lead	Andy Judd / NJO	(973)316-9300 Ext. 4540	973-769-1473 (cell)  908-979-1433 (home)
CH2M HILL - FS Lead	Matt Germon / BOS	802-453-5754 (home office)	802-349-9834
CH2M HILL Safety Coordinator	David Reamer/NJO	(973)316-9300 Ext. 4520	908-410-5999
CH2M Hill HS&E Manager	Steve Beck/MKE	(414) 847-0277	(414) 526-4517
CH2M HILL Environmental Compliance Coordinator (ECC)	Linda Hickok/SYR	(315) 422-8495 Ext. 229	(315) 751-3903

### CH2M HILL Subcontractors Contact List

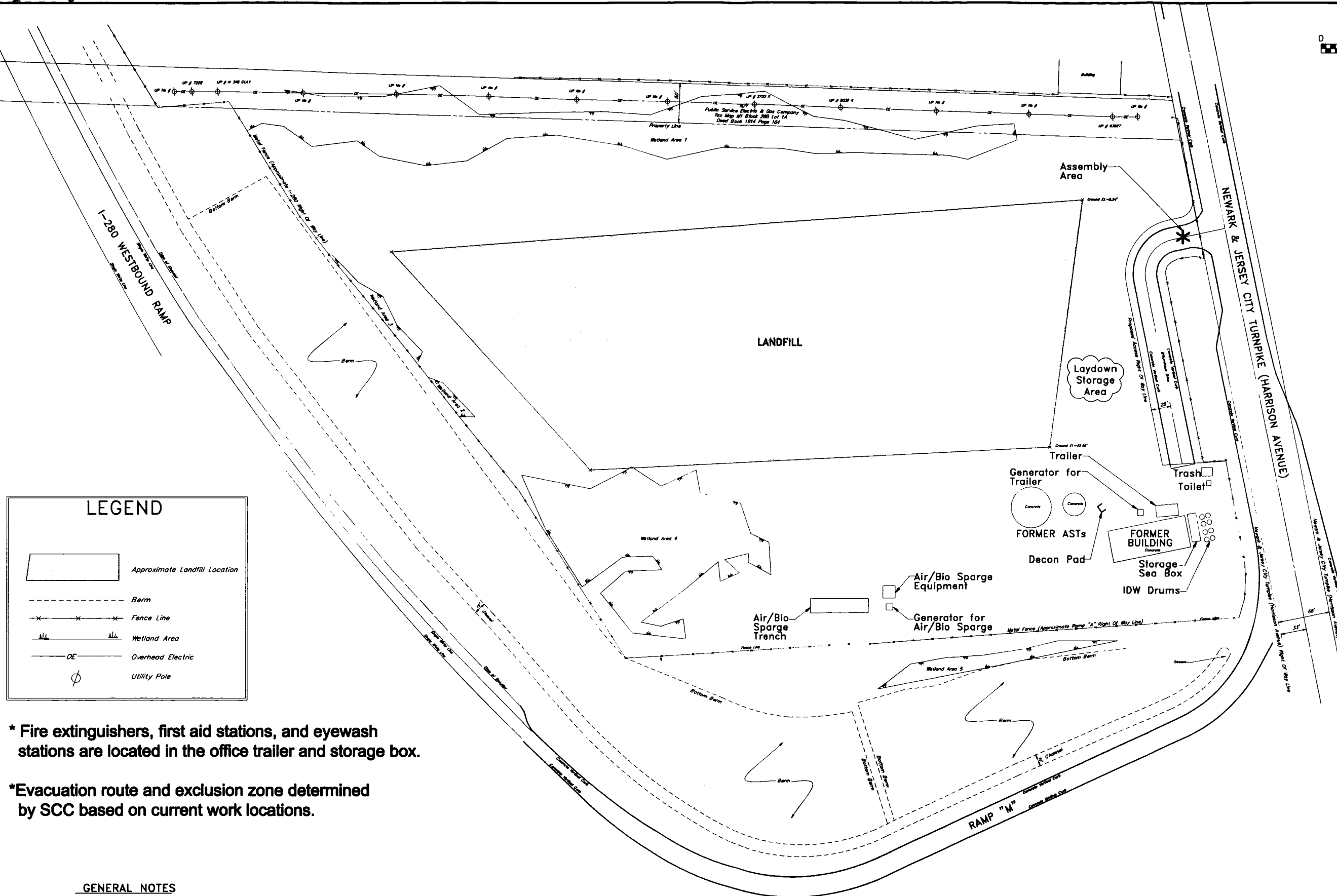
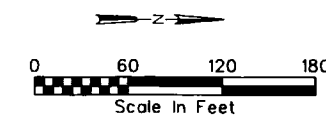
Subcontractor	Primary Task	Site Manager	Phone	Safety Rep.	Phone
TBD					



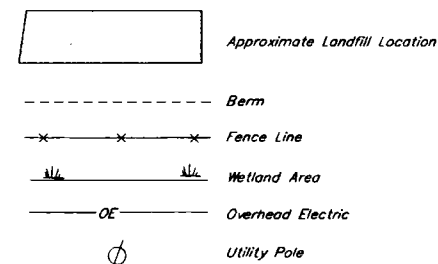
# Site Map

**This page is reserved for a Site Map.**

**Note locations of Support, Decontamination, and Exclusion Zones;; first aid station; evacuation routes; and assembly areas.**



# LEGEND



\* Fire extinguishers, first aid stations, and eyewash stations are located in the office trailer and storage box.

\*Evacuation route and exclusion zone determined by SCC based on current work locations.

## GENERAL NOTES

- BENCHMARK: REBAR WITH RETIEW CAP (TR-1) BEING LOCATED APPROXIMATELY 284' SOUTH OF THE CENTERLINE OF THE HARRISON AVENUE AND BEING APPROXIMATELY 637' SOUTHEASTERLY OF UTILITY POLE NUMBER 63627. ELEVATION=23.95' (NAVD 88 DATUM)
- BASIS OF BEARING IS NEW JERSEY STATE PLANE COORDINATE SYSTEM (NAD 83 DATUM).

Figure 1  
Site Plan  
Diamond Head Phase 2 RI/FS  
Kearny, New Jersey 07032  
**CH2MHILL**

# **1 Tasks to be Performed Under this Plan**

## **1.1 Description of Tasks**

(Reference Field Project Start-up Form)

Refer to project documents (i.e., Work Plan) for detailed task information. A health and safety risk analysis (Section 1.2) has been performed for each task and is incorporated in this plan through task-specific hazard controls and requirements for monitoring and protection. Tasks other than those listed below require an approved amendment or revision to this plan before tasks begin. Refer to Section 8.2 for procedures related to “clean” tasks that do not involve hazardous waste operations and emergency response (Hawwoper).

### **1.1.1 Hawwoper-Regulated Tasks**

- Geoprobe/Direct Push Technology with Laser Induced Fluorescence (LIF)
- Surveying
- Test pit excavation
- Installation and operation of Air Sparge pilot test.
- LNAPL pumping/skimming recovery
- Drilling & Monitoring Well installation
- Groundwater monitoring
- Soil Sampling
- Surface water sampling from shore
- Sediment sampling from shore
- Oversight of generated wastes loading for disposal.
- Cleaning Frac Tanks
- Monitoring and controlling dust
- IDW sampling

### **1.1.2 Non-Hawwoper-Regulated Tasks**

Under specific circumstances, the training and medical monitoring requirements of federal or state Hawwoper regulations are not applicable. It must be demonstrated that the tasks can be performed without the possibility of exposure in order to use non-Hawwoper-trained personnel. Prior approval from the Health and Safety Manager (HSM) is required before these tasks are conducted on regulated hazardous waste sites.

#### **TASKS**

- Utility location
- Construction of temporary roadways
- Electrical installation
- Grubbing and Clearing with power sickle.
- Mechanical installations (equipment, pumps, etc.)
- Wetlands work

#### **CONTROLS**

- Brief on hazards, limits of access, and emergency procedures
- Post contaminant areas as appropriate (refer to Section 8.2 for details)
- Sample and monitor as appropriate (refer to Section 5.0)

## 1.2 Task Hazard Analysis

(Refer to Section 2 for hazard controls)

POTENTIAL HAZARDS	TASKS											
	Test pit/ Excavation	Drilling, & Well installation	Groundwater monitoring, aquifer testing	Surface water and sediment sampling from the shore	Surveying	Dust monitoring & suppression	Observe loading of material for offsite disposal	Installation & operation of Air Sparge pilot test	LNAPL pumping & skimming	Soil Sampling	Cleaning Frac Tank	Oversight of Waste loading/disposal
Flying debris/objects	X	X		X		X	X		X		X	X
Noise > 85dBA	X	X						X		X	X	X
Electrical	X	X	X					X			X	
Suspended loads	X	X					X	X				X
Buried utilities, drums, tanks	X	X										
Slip, trip, fall	X	X	X	X	X	X	X	X	X	X	X	X
Back injury	X	X	X	X		X		X			X	
Confined space entry	X				X						X	
Trenches / excavations	X							X				
Visible lightning	X	X	X	X	X	X			X	X	X	X
Vehicle traffic						X	X	X	X	X		X
Elevated work areas/falls	X			X								
Fires	X	X		X								
Entanglement		X										
Drilling		X										
Heavy equipment	X	X					X			X		X
Working near water				X								
Chemical Exposure	X	X	X	X				X	X	X	X	
Biological Hazards	X	X	X	X	X	X	X	X	X	X		X
IDW Drum Sampling												

### 1.3 Project HS&E Change Management Form

*This evaluation form should be reviewed on a continuous basis to determine if the project-specific HASP adequately addresses ongoing project work, and it should be modified whenever new tasks are contemplated or changed conditions are encountered.*

Project Task: Phase 2 Focused RI/FS

Activity Manager: Juliana Hess/NJO

Project Number: 359471

Project Name: Diamond Head

Evaluation Checklist		Yes	No
1.	Has CH2M HILL staff changed?		
2.	Has a new subcontractor been added to the project?		
3.	Is any chemical or product to be used that is not listed in Attachment 7 of the plan?		
4.	Are all tasks addressed in Section 1.1 of the project-specific HASP?		
5.	Have new contaminants or higher than anticipated levels of original contaminants been encountered?		
6.	Have other safety, equipment, activity, or environmental hazards been encountered that are not addressed in Section 2.1 of the plan?		

*If the answer is "YES" to Questions 1-3, a HASP revision is NOT needed. Please take the following actions:*

- Confirm that the staff's medical and training status is current – check training records at: <http://www.int.ch2m.com/hands> (or contact your regional SPA) and confirm subcontractor qualifications.
- Confirm with the project KA that subcontractor safety performance has been reviewed and is acceptable.
- Confirm with H&S that subcontractor safety procedures have been reviewed and are acceptable.

*If the answer is "YES" to Questions 4-6, a HASP revision MAY BE NEEDED. To determine if a revision is needed, please contact HS&E directly or complete the field project start-up form at:*

<http://www.int.ch2m.com/hsdocgen/fppricing.asp>.

## 2 Hazard Controls

This section provides safe work practices and control measures used to reduce or eliminate potential hazards. These practices and controls are to be implemented by the party in control of either the site or the particular hazard. CH2M HILL employees and subcontractors must remain aware of the hazards affecting them regardless of who is responsible for controlling the hazards. CH2M HILL employees and subcontractors who do not understand any of these provisions should contact the SSC for clarification.

In addition to the controls specified in this section, Project-Activity Self-Assessment Checklists are contained in Attachment 6. These checklists are to be used to assess the adequacy of CH2M HILL and subcontractor site-specific safety requirements. The objective of the self-assessment process is to identify gaps in project safety performance, and prompt for corrective actions in addressing these gaps. Self-assessment checklists should be completed early in the project, when tasks or conditions change, or when otherwise specified by the HSM. The self-assessment checklists, including documented corrective actions, should be made part of the permanent project records, and be promptly submitted to the HSM.

Project-specific frequency for completing self-assessments: Initially and as conditions change.

## 2.1 Project-Specific Hazards

### 2.1.1 Inclement Weather

- Work may proceed in light rain- wear rain gear.
- Exposure to slips, trips and falls is increased during rainy and snowing conditions.
- Take cover in field vehicle during adverse weather conditions (High winds, heavy rain).
  - Work shall cease and cover sought in the event of lightning or tornado warnings.
  - Identify "Take Shelter" areas before starting project.
  - Work may proceed in light rain- wear rain gear.
- Notify the Project Manager and Client Representative after shelter has been sought.

Adverse weather conditions requiring immediate suspension of field work activities are defined as the following:

- Thunder or lightning. Thunderstorm watches or warning, as the situation warrants, will be used as an alert to potential electric activity. Typically, a 30-minute stand-down occurs to allow the storm cell to pass the area. If lightning or thunder is observed within the stand down period, the 30-minute time frame is extended until electrical activity ceases.
- Sustained wind speeds of 20 miles per hour (mph) or wind gusts of 25 mph for boating activities.
- Sustained wind speeds of 25 mph or wind gusts of 35 mph for high profile work where wind chill is not a factor, i.e., greater than 60°F.
- Sustained wind speeds of 40 mph or wind gusts of 45 mph for non-high profile work.
- Moderate rain and/or snow fall of 0.11 to 0.3 inch per hour during hoisting activities. Freezing rain is also cause for suspension of hoist use.
- An equivalent wind chill factor of -24°F on the wind chill factor chart (below) will trigger systematic shut down of all non-emergency work activities.
- A tornado/hurricane warning for the general area or county will suffice in requiring a general work stoppage.
- If you are inadvertently caught outside in a thunder/lightning storm, take the following precautions:
  - Seek shelter among densely wooded areas.
  - Avoid lone trees as shelter.
  - Avoid open, bare areas.
  - Do not cross water bodies.

### 2.1.2 Field Vehicle & Rental Car Usage

- Familiarize yourself with vehicle features.
  - Mirror adjustments, seat adjustments, cruise control features, etc.
  - Pre-program radio stations.
- Ensure snow, ice and fog is completely removed from windows prior to driving.
- Review driving directions prior to departing
- Inspect vehicle prior to departure (tire pressure, tread, signals, horn, lights).
- Adjust headrest to proper position.
- Always wear seatbelt while operating vehicle.
- Inquire; and obtain, a vehicle pass from the client if required.
- Observe warning signs, yield to traffic, and observe all posted traffic signs.
- Pull off the road, put the car in park and turn on flashers before talking on a mobile phone.
- Maintain both a First Aid kit, Bloodborne Pathogens kit and Fire Extinguisher in the field vehicle at all times.
- Close car doors slowly and carefully. Fingers can get pinched in doors or in the trunk.
- Use a spotter when backing up near monitoring wells.
- Turn off vehicle when leaving it. Leave keys in vehicle.
- Maintain valuables in the trunk.



### 2.1.3 Groundwater & Soil Sampling

- Wear the appropriate PPE when sampling, including safety glasses, nitrile gloves, and steel toe boots (refer to Section 4).
- Monitor headspace of wells prior to sampling to minimize any vapor inhalation (refer to Section 5 on air monitoring).
- Use caution when opening well lids. Wells may contain poisonous spiders, hornet or wasp nests.
- Use the appropriate lifting procedures (see Master HASP) when unloading equipment and sampling at each well.
- Avoid sharp edges on well casings.
- If dermal contact with the groundwater and acid used in sample preservation, wash exposed skin thoroughly with soap and water.
- Avoid eating and drinking on site and during sampling.
- Use ear plugs during sampling if sampling involves a generator.
- Containerize all purge water and transport to the appropriate storage area.

### 2.1.4 Working around Material Handling Equipment

- Never approach operating equipment from the rear. Always make positive contact with the operator, and confirm that the operator has stopped the motion of the equipment.
- Never approach the side of operating equipment; remain outside of the swing and turning radius.
- Maintain distance from pinch points of operating equipment.
- Because heavy equipment may not be equipped with properly functioning reverse signal alarms, never turn your back on any operating equipment.
- Never climb onto operating equipment or operate contractor/subcontractor equipment.
- Never ride contractor/subcontractor equipment unless it is designed to accommodate passengers; equipped with firmly attached passenger seat.
- Never work or walk under a suspended load.
- Never use equipment as a personnel lift; do not ride excavator buckets or crane hooks.
- Always stay alert and maintain a safe distance from operating equipment, especially equipment on cross slopes and unstable terrain.

### 2.1.5 Slips, Trips, and Falls

- Institute and maintain good housekeeping practices.
- Pick up tools and debris in the work area.
- Walk or climb only on equipment and/or surfaces designed for personnel access.
- Be aware of poor footing and potential slipping and tripping hazards in the work area.

### 2.1.6 Drilling and Direct Push Technology

(Reference CH2M HILL SOP HS-204, *Drilling*)

- Only authorized personnel are permitted to operate drill rigs.
- Stay clear of areas surrounding drill rigs during every startup.
- Stay clear of the rotating augers and other rotating components of drill rigs.
- Stay as clear as possible of all hoisting operations. Loads shall not be hoisted overhead of personnel.
- Do not wear loose-fitting clothing or other items such as rings or watches that could get caught in moving parts. Long hair should have it restrained.
- If equipment becomes electrically energized, personnel shall be instructed not to touch any part of the equipment or attempt to touch any person who may be in contact with the electrical current. The utility company or appropriate party shall be contacted to have line de-energized prior to approaching the equipment.
- Smoking around drilling operations is prohibited.
- The Site Safety Coordinator shall complete a **Self-Assessment Checklist for Drilling**, initially, when conditions change and periodically thereafter. Refer to **Attachment 6** of this HASP.

### **2.1.7 Test Pit Excavation**

(Reference CH2M HILL SOP HS-307, *Excavations*)

- Do not enter the excavations unless completely necessary, and only after the competent person has completed the daily inspection and has authorized entry.
- Follow all excavation entry requirements established by the competent person.
- Do not enter excavations where protective systems are damaged or unstable.
- Do not enter excavations where objects or structures above the work location may become unstable and fall into the excavation.
- Do not enter excavations with the potential for a hazardous atmosphere until the air has been tested and found to be at safe levels.
- Do not enter excavations with accumulated water unless precautions have been taken to prevent excavation cave-in.
- H&S Self-Assessment Checklist - Excavations, found in **Attachment 6** of this plan, should be used to evaluate excavations prior to entry.

### **2.1.8 Earthmoving Equipment**

(Reference CH2M HILL SOP HS-306, *Earthmoving Equipment*)

- Only authorized personnel are permitted to operate earthmoving equipment.
- Maintain safe distance from operating equipment and stay alert of equipment movement. Avoid positioning between fixed objects and operating equipment and equipment pinch points, remain outside of the equipment swing and turning radius. Pay attention to backup alarms, but not rely on them for protection. Never turn your back on operating equipment.
- Approach operating equipment only after receiving the operator's attention. The operator shall acknowledge your presence and stop movement of the equipment. Caution shall be used when standing next to idle equipment; when equipment is placed in gear it can lurch forward or backward. Never approach operating equipment from the side or rear where the operator's vision is compromised.
- When required to work in proximity to operating equipment, wear high-visibility vests to increase visibility to equipment operators. For work performed after daylight hours, vests shall be made of reflective material or include a reflective stripe or panel.
- Do not ride on earthmoving equipment unless it is specifically designed to accommodate passengers. Only ride in seats that are provided for transportation and that are equipped with seat belts.
- Stay as clear as possible of all hoisting operations. Loads shall not be hoisted overhead of personnel.
- Earthmoving equipment shall not be used to lift or lower personnel.
- If equipment becomes electrically energized, personnel shall be instructed not to touch any part of the equipment or attempt to touch any person who may be in contact with the electrical current. The utility company or appropriate party shall be contacted to have line de-energized prior to approaching the equipment.

### **2.1.9 Working Above or Near Water**

- Fall protection should be provided to prevent personnel from falling into water. Where fall protection systems are not provided and the danger of drowning exists, U.S. Coast Guard-approved personal flotation devices (PFDs), or life jacket, shall be worn.
- Inspect PFDs prior to use. Do not use defective PFDs.
- A life-saving skiff must be provided for emergency rescue.
- A minimum of one ring buoy with 90 feet of 3/8-inch solid-braid polypropylene (or equal) rope must be provided for emergency rescue.

### **2.1.10 Survey Lasers**

- Laser beams used in surveying may be hazardous to the eyes.
- The severity of the hazard depends on the type of laser and its power.
- Avoid direct eye contact with the beam.
- This is most important when wearing corrective eyeglasses which can intensify the beam's focus on the retina.
- Lasers used in surveying are usually low power.
- Lasers must be posted with safety warning signs.

### **2.1.11 Hand and Power Tools**

- Tools shall be inspected prior to use and damaged tools will be tagged and removed from service.
- Hand tools will be used for their intended use and operated in accordance with manufacturer instructions and design limitations;
- Maintain all hand and power tools in a safe condition.
- Use PPE (such as gloves, safety glasses, earplugs, and face shields) when exposed to a hazard from a tool.
- Do not carry or lower a power tool by its cord or hose.
- Portable power tools will be plugged into GFCI protected outlets; and
- Portable power tools will be Underwriters Laboratories (UL) listed and have a three-wire grounded plug or be double insulated.
- Disconnect tools from energy sources when they are not in use, before servicing and cleaning them, and when changing accessories (such as blades, bits, and cutters).
- Safety guards on tools must remain installed while the tool is in use and must be promptly replaced after repair or maintenance has been performed.
- Store tools properly in a place where they will not be damaged or come in contact with hazardous materials.
- If a cordless tool is connected to its recharge unit, both pieces of equipment must conform strictly with electrical standards and manufacturer's specifications.
- Tools used in an explosive environment must be rated for work in that environment (that is, intrinsically safe, spark-proof, etc.).
- When using a knife or blade tool, stroke or cut away from the body with a smooth motion. Be careful not to use excessive force that could damage the tool, the material being cut, or unprotected hands.
- Working with manual and pistol-grip hand tools may involve highly repetitive movement, extended elevation, constrained postures, and/or awkward positioning of body members (for example, hand, wrist, arm, shoulder, neck, etc.). Consider alternative tool designs, improved posture, the selection of appropriate materials, changing work organization, and sequencing to prevent muscular, skeletal, repetitive motion, and cumulative trauma stressors

### **2.1.12 Pressure Washing**

- **To Prevent Malfunction**
  - Review operation manual before initial use.
  - Ensure connections are correctly attached and tight.
  - Inspect hoses (no broken braids, flat surfaces, or damaged threads).
  - Perform a pre-operation check before each use.
- **During Pressure Washing Operations**
  - Only capable and qualified persons operate equipment.
  - Water pressure at the nozzle tip shall be less than 3,600 psig.
  - The operator shall always maintain a firm grip on the lance
  - The operator shall not place their hand or body in front of the wand while it is operating.
  - The wand trigger shall never be tied or blocked in the open position.
  - The operator shall not direct the water stream towards people or electrical components.
  - Shut off equipment when not in use.
  - Prevent the formation of standing water or ice.
- **Personal Protective Equipment**
  - At a minimum, eye protection and footwear with slip resistant soles and ankle support are required.
  - Consult Material Safety Data Sheets (MSDS's) if detergents are used.
- **Equipment Set Up:**
  - Where possible, place motor outside to prevent build up of carbon monoxide.
  - When it is not possible to place the motor outside, place it near an open door and monitor for CO.
- **Refueling**
  - Never refuel a gas engine until it is turned off and had a chance to cool.
  - Store extras fuel in an approved metal fuel can.
  - Have a fire extinguisher readily available.

### 2.1.13 Confined Space Entry

(Reference CH2M HILL SOP HS-203, *Confined Space Entry*)

CH2M HILL staff are not authorized to enter confined spaces on this project. Confined space entry requires additional health and safety procedures, training, and a permit. If conditions change such that confined-space entry is necessary, contact the HSM to develop the required entry permit.

When planned activities will not include confined-space entry, permit-required confined spaces accessible to CH2M HILL personnel are to be identified before the task begins. The SSC is to confirm that permit spaces are properly posted or that employees are informed of their locations and hazards.

Reference the Confined Space Entry SOP (HSE-203) for more information.

**The following requirements must be met by CH2M HILL's Subcontractor prior to permit-required confined space entry:**

- Complete an Activity Hazard Analysis (AHA) prior to commencing the task. This AHA must be reviewed and accepted by the CH2M HILL Health and Safety Dept. prior to entry- **Refer to Attachment 10.**
- Submission of subcontractor staff training records for Confined Space Entry must be submitted to the project staff and retained for the duration of the contract.
- Complete a Confined Space Entry Permit (CSEP)- **Refer to Attachment 5.**
- Attend a pre-entry briefing conducted by the entry supervisor if you will be entering or attending permit-required confined spaces.
- Verify that the entry supervisor has authorized entry and that all permit or certificate requirements have been satisfied.
- Limits entry into the space only to those listed on the Authorization/ Accountability Log.
- Conducts atmospheric monitoring at the frequency specified on the permit and results are within acceptable safe levels.

The following requirements must be met during permit-required confined space entry:

- Maintain communication between the attendant and entrants to enable the attendant to monitor entrant status.
- Use equipment specified on the permit or certificate accordingly.
- Follow all permit or certificate requirements.
- Evacuate the space upon orders of the attendant or entry supervisor, when an alarm is sounded, or when a prohibited condition or dangerous situation is recognized.
- Inform the entry supervisor of any hazards confronted or created in the space or any problems encountered during entry.

### 2.1.14 IDW Drum Sampling

Personnel are permitted to handle and/or sample drums containing investigation-derived waste (IDW) only; handling or sampling other drums requires a plan revision or amendment approved by the CH2M HILL HSM. The following control measures will be taken when sampling drums containing IDW:

- Minimize transportation of drums.
- Sample only labeled drums or drums known to contain IDW.
- Use caution when sampling bulging or swollen drums. Relieve pressure slowly.
- If drums contain, or potentially contain, flammable materials, use non-sparking tools to open.
- Picks, chisels, and firearms may not be used to open drums.
- Reseal bung holes or plugs whenever possible.
- Avoid mixing incompatible drum contents.
- Sample drums without leaning over the drum opening.
- Transfer the content of drums using a method that minimizes contact with material.

## **2.2 General Hazards**

### **2.2.1 General Practices and Housekeeping**

(Reference CH2M HILL SOP HS-209, *General Practices*)

- Site work should be performed during daylight hours whenever possible. Work conducted during hours of darkness require enough illumination intensity to read a newspaper without difficulty.
- Good housekeeping must be maintained at all times in all project work areas.
- Common paths of travel should be established and kept free from the accumulation of materials.
- Keep access to aisles, exits, ladders, stairways, scaffolding, and emergency equipment free from obstructions.
- Provide slip-resistant surfaces, ropes, and/or other devices to be used.
- Specific areas should be designated for the proper storage of materials.
- Tools, equipment, materials, and supplies shall be stored in an orderly manner.
- As work progresses, scrap and unessential materials must be neatly stored or removed from the work area.
- Containers should be provided for collecting trash and other debris and shall be removed at regular intervals.
- All spills shall be quickly cleaned up. Oil and grease shall be cleaned from walking and working surfaces.

### **2.2.2 Hazard Communication**

(Reference CH2M HILL SOP HS-107, *Hazard Communication*)

The SSC is to perform the following:

- Complete an inventory of chemicals brought on site by CH2M HILL using **Attachment 2**.
- Confirm that an inventory of chemicals brought on site by CH2M HILL subcontractors is available.
- Request or confirm locations of Material Safety Data Sheets (MSDSs) from the client, contractors, and subcontractors for chemicals to which CH2M HILL employees potentially are exposed.
- Before or as the chemicals arrive on site, obtain an MSDS for each hazardous chemical.
- Label chemical containers with the identity of the chemical and with hazard warnings, and store properly.
- Give employees required chemical-specific HAZCOM training using **Attachment 3**.
- Store all materials properly, giving consideration to compatibility, quantity limits, secondary containment, fire prevention, and environmental conditions.

### **2.2.3 Shipping and Transportation of Chemical Products**

(Reference CH2M HILL's *Procedures for Shipping and Transporting Dangerous Goods*)

Chemicals brought to the site might be defined as hazardous materials by the U.S. Department of Transportation (DOT). All staff who ship the materials or transport them by road must receive CH2M HILL training in shipping dangerous goods. All hazardous materials that are shipped (e.g., via Federal Express) or are transported by road must be properly identified, labeled, packed, and documented by trained staff. Contact the HSM or the Equipment Coordinator for additional information.

### **2.2.4 Compressed Gas Cylinders**

- Valve caps must be in place when cylinders are transported, moved, or stored.
- Cylinder valves must be closed when cylinders are not being used and when cylinders are being moved.
- Cylinders must be secured in an upright position at all times.
- Cylinders must be shielded from welding and cutting operations and positioned to avoid being struck or knocked over; contacting electrical circuits; or exposed to extreme heat sources.
- Cylinders must be secured on a cradle, basket, or pallet when hoisted; they may not be hoisted by choker slings.

## **2.2.5 Lifting**

(Reference CH2M HILL SOP HS-112, *Lifting*)

- Proper lifting techniques must be used when lifting any object.
  - Plan storage and staging to minimize lifting or carrying distances.
  - Split heavy loads into smaller loads.
  - Use mechanical lifting aids whenever possible.
  - Have someone assist with the lift – especially for heavy or awkward loads.
  - Make sure the path of travel is clear prior to the lift.

## **2.2.6 Fire Prevention**

(Reference CH2M HILL SOP HS-208, *Fire Prevention*)

- Fire extinguishers shall be provided so that the travel distance from any work area to the nearest extinguisher is less than 100 feet. When 5 gallons or more of a flammable or combustible liquid is being used, an extinguisher must be within 50 feet. Extinguishers must:
  - be maintained in a fully charged and operable condition,
  - be visually inspected each month, and
  - undergo a maintenance check each year.
- The area in front of extinguishers must be kept clear.
- Post “Exit” signs over exiting doors, and post “Fire Extinguisher” signs over extinguisher locations.
- Combustible materials stored outside should be at least 10 feet from any building.
- Solvent waste and oily rags must be kept in a fire resistant, covered container until removed from the site.
- Flammable/combustible liquids must be kept in approved containers, and must be stored in an approved storage cabinet.

## **2.2.7 Electrical**

(Reference CH2M HILL SOP HS-206, *Electrical*)

- Only qualified personnel are permitted to work on unprotected energized electrical systems.
- Do not tamper with electrical wiring and equipment unless qualified to do so. All electrical wiring and equipment must be considered energized until lockout/tagout procedures are implemented.
- Inspect electrical equipment, power tools, and extension cords for damage prior to use. Do not use defective electrical equipment, remove from service.
- All temporary wiring, including extension cords and electrical power tools, must have ground fault circuit interrupters (GFCIs) installed.
- Extension cords must be:
  - equipped with third-wire grounding.
  - covered, elevated, or protected from damage when passing through work areas.
  - protected from pinching if routed through doorways.
  - not fastened with staples, hung from nails, or suspended with wire.
- Electrical power tools and equipment must be effectively grounded or double-insulated UL approved.
- Operate and maintain electric power tools and equipment according to manufacturers' instructions.
- Maintain safe clearance distances between overhead power lines and any electrical conducting material unless the power lines have been de-energized and grounded, or where insulating barriers have been installed to prevent physical contact. Maintain at least 10 feet from overhead power lines for voltages of 50 kV or less, and 10 feet plus ½ inch for every 1 kV over 50 kV.
- Temporary lights shall not be suspended by their electric cord unless designed for suspension. Lights shall be protected from accidental contact or breakage.
- Protect all electrical equipment, tools, switches, and outlets from environmental elements.



## 2.2.8 Stairways and Ladders

(Reference CH2M HILL SOP HS-214, *Stairways and Ladders*)

- Stairway or ladder is generally required when a break in elevation of 19 inches or greater exists.
- Personnel should avoid using both hands to carry objects while on stairways; if unavoidable, use extra precautions.
- Personnel must not use pan and skeleton metal stairs until permanent or temporary treads and landings are provided the full width and depth of each step and landing.
- Ladders must be inspected by a competent person for visible defects prior to each day's use. Defective ladders must be tagged and removed from service.
- Ladders must be used only for the purpose for which they were designed and shall not be loaded beyond their rated capacity.
- Only one person at a time shall climb on or work from an individual ladder.
- User must face the ladder when climbing; keep belt buckle between side rails
- Ladders shall not be moved, shifted, or extended while in use.
- User must use both hands to climb; use rope to raise and lower equipment and materials
- Straight and extension ladders must be tied off to prevent displacement
- Ladders that may be displaced by work activities or traffic must be secured or barricaded
- Portable ladders must extend at least 3 feet above landing surface
- Straight and extension ladders must be positioned at such an angle that the ladder base to the wall is one-fourth of the working length of the ladder
- Stepladders are to be used in the fully opened and locked position
- Users are not to stand on the top two steps of a stepladder; nor are users to sit on top or straddle a stepladder
- Fixed ladders  $\geq 24$  feet in height must be provided with fall protection devices.
- Fall protection should be considered when working from extension, straight, or fixed ladders greater than six feet from lower levels and both hands are needed to perform the work, or when reaching or working outside of the plane of ladder side rails.

## 2.2.9 Procedures for Locating Buried Utilities

### Local Utility Mark-Out Service

Name: "One Call" Phone: 1-800-272-1000
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- Where available, obtain utility diagrams for the facility.
- Review locations of sanitary and storm sewers, electrical conduits, water supply lines, natural gas lines, and fuel tanks and lines.
- Review proposed locations of intrusive work with facility personnel knowledgeable of locations of utilities. Check locations against information from utility mark-out service.
- Where necessary (e.g., uncertainty about utility locations), excavation or drilling of the upper depth interval should be performed manually
- Monitor for signs of utilities during advancement of intrusive work (e.g., sudden change in advancement of auger or split spoon).
- When the client or other onsite party is responsible for determining the presence and locations of buried utilities, the SSC should confirm that arrangement.

## 2.2.10 Heat Stress (Reference CH2M HILL SOP HS-211, *Heat and Cold Stress*)

- Drink 16 ounces of water before beginning work. Disposable cups and water maintained at 50°F to 60°F should be available. Under severe conditions, drink 1 to 2 cups every 20 minutes, for a total of 1 to 2 gallons per day. Do not use alcohol in place of water or other nonalcoholic fluids. Decrease your intake of coffee and caffeinated soft drinks during working hours.
- Acclimate yourself by slowly increasing workloads (e.g., do not begin with extremely demanding activities).
- Use cooling devices, such as cooling vests, to aid natural body ventilation. These devices add weight, so their use should be balanced against efficiency.
- Use mobile showers or hose-down facilities to reduce body temperature and cool protective clothing.
- Conduct field activities in the early morning or evening and rotate shifts of workers, if possible.
- Avoid direct sun whenever possible, which can decrease physical efficiency and increase the probability of heat stress. Take regular breaks in a cool, shaded area. Use a wide-brim hat or an umbrella when working under direct sun for extended periods.
- Provide adequate shelter/shade to protect personnel against radiant heat (sun, flames, hot metal).
- Maintain good hygiene standards by frequently changing clothing and showering.
- Observe one another for signs of heat stress. Persons who experience signs of heat syncope, heat rash, or heat cramps should consult the SSC to avoid progression of heat-related illness.

SYMPTOMS AND TREATMENT OF HEAT STRESS					
	Heat Syncope	Heat Rash	Heat Cramps	Heat Exhaustion	Heat Stroke
Signs and Symptoms	Sluggishness or fainting while standing erect or immobile in heat.	Profuse tiny raised red blister-like vesicles on affected areas, along with prickling sensations during heat exposure.	Painful spasms in muscles used during work (arms, legs, or abdomen); onset during or after work hours.	Fatigue, nausea, headache, giddiness; skin clammy and moist; complexion pale, muddy, or flushed; may faint on standing; rapid thready pulse and low blood pressure; oral temperature normal or low	Red, hot, dry skin; dizziness; confusion; rapid breathing and pulse; high oral temperature.
Treatment	Remove to cooler area. Rest lying down. Increase fluid intake. Recovery usually is prompt and complete.	Use mild drying lotions and powders, and keep skin clean for drying skin and preventing infection.	Remove to cooler area. Rest lying down. Increase fluid intake.	Remove to cooler area. Rest lying down, with head in low position. Administer fluids by mouth. Seek medical attention.	Cool rapidly by soaking in cool-but not cold-water. Call ambulance, and get medical attention immediately!

### Monitoring Heat Stress

These procedures should be considered when the ambient air temperature exceeds 70°F, the relative humidity is high (>50 percent), or when workers exhibit symptoms of heat stress.

The heart rate (HR) should be measured by the radial pulse for 30 seconds, as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 100 beats/minute, or 20 beats/minute above resting pulse. If the HR is higher, the next work period should be shortened by 33 percent, while the length of the rest period stays the same. If the pulse rate still exceeds 100 beats/minute at the beginning of the next rest period, the work cycle should be further shortened by 33 percent. The procedure is continued until the rate is maintained below 100 beats/minute, or 20 beats/minute above resting pulse.

### 2.2.11 Cold Stress

(Reference CH2M HILL SOP HS-211, *Heat and Cold Stress*)

- Be aware of the symptoms of cold-related disorders, and wear proper, layered clothing for the anticipated fieldwork. Appropriate rain gear is a must in cool weather.
- Consider monitoring the work conditions and adjusting the work schedule using guidelines developed by the U.S. Army (wind-chill index) and the National Safety Council (NSC).
- Wind-Chill Index is used to estimate the combined effect of wind and low air temperatures on exposed skin. The wind-chill index does not take into account the body part that is exposed, the level of activity, or the amount or type of clothing worn. For those reasons, it should only be used as a guideline to warn workers when they are in a situation that can cause cold-related illnesses.
- NSC Guidelines for Work and Warm-Up Schedules can be used with the wind-chill index to estimate work and warm-up schedules for fieldwork. The guidelines are not absolute; workers should be monitored for symptoms of cold-related illnesses. If symptoms are not observed, the work duration can be increased.
- Persons who experience initial signs of immersion foot, frostbite, hypothermia should consult the SSC to avoid progression of cold-related illness.
- Observe one another for initial signs of cold-related disorders.
- Obtain and review weather forecast – be aware of predicted weather systems along with sudden drops in temperature, increase in winds, and precipitation.

SYMPTOMS AND TREATMENT OF COLD STRESS			
	Immersion (Trench) Foot	Frostbite	Hypothermia
Signs and Symptoms	Feet discolored and painful; infection and swelling present.	Blanched, white, waxy skin, but tissue resilient; tissue cold and pale.	Shivering, apathy, sleepiness; rapid drop in body temperature; glassy stare; slow pulse; slow respiration.
Treatment	Seek medical treatment immediately.	Remove victim to a warm place. Re-warm area quickly in warm-but not hot-water. Have victim drink warm fluids, but not coffee or alcohol. Do not break blisters. Elevate the injured area, and get medical attention.	Remove victim to a warm place. Have victim drink warm fluids, but not coffee or alcohol. Get medical attention.



## Wind Chill Chart



		Temperature (°F)																		
		Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
Wind (mph)	5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63	
	10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72	
	15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77	
	20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81	
	25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84	
	30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87	
	35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89	
	40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91	
	45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93	
	50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95	
	55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97	
	60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98	

Frostbite Times

30 minutes

10 minutes

5 minutes

Wind Chill (°F) = 35.74 + 0.6215T - 35.75(V<sup>0.16</sup>) + 0.4275T(V<sup>0.16</sup>)

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

## 2.3 Biological Hazards and Controls

### 2.3.1 Bloodborne Pathogens

(Reference CH2M HILL SOP HS-202, *Bloodborne Pathogens*)

Exposure to bloodborne pathogens may occur when rendering first aid or CPR, or when coming into contact with landfill waste or waste streams containing potentially infectious material. Exposure controls and personal protective equipment (PPE) are required as specified in CH2M HILL SOP HS-202, *Bloodborne Pathogens*. Hepatitis B vaccination must be offered before the person participates in a task where exposure is a possibility.

### 2.3.2 Bees and other insect stings

- Bee and other stinging insects may be encountered almost anywhere and may present a serious hazard, particularly to people who are allergic.
- Watch for and avoid nests.
- Keep exposed skin to a minimum.
- Carry a kit if you have had allergic reactions in the past, and inform the SSC and/or buddy.
- If a stinger is present, remove it carefully with tweezers.
- Wash and disinfect the wound, cover it, and apply ice.
- Watch for allergic reaction; seek medical attention if a reaction develops.

### 2.3.3 Feral Dogs

- Equip each field team with "Dog Repellant" spray.
  - Read manufactures instructions.
  - Position yourself up-wind if possible before using.
  - Only use if attacked-- not just threatened.
- Avoid all dogs - both leashed and stray.
- Don't disturb a dog while it is sleeping, eating or caring for puppies.
- If a dog approaches to sniff you - stay still.
- An aggressive dog has a tight mouth, flattened ears and a direct stare. The hair on the back of it's neck and front shoulders (hackles) may stand up.
- If you're threatened by a dog, remain calm - don't scream and avoid eye contact.
- If you say anything, speak calmly and firmly.
- Don't turn and run - try to stay still until the dog leaves, or back away slowly until the dog is out of sight or you have reached safety (e.g., vehicle).
- If attacked, retreat to vehicle or attempt to place something between you and the dog.

- If you fall or are knocked to the ground, curl into a ball with your hands over your head and neck, and protect your face.
- If bitten, immediately scrub the bite site vigorously with soap and water.
- Report the incident to the local authorities.
- Seek medical attention as soon as possible.

#### **2.3.4 Snakes**

- Snakes typically are found in underbrush and tall grassy areas.
- If you encounter a snake, stay calm and look around; there may be other snakes.
- Turn around and walk away on the same path you used to approach the area.
- If a person is bitten by a snake, wash and immobilize the injured area, keeping it lower than the heart if possible.
- Seek medical attention immediately.
- **DO NOT** apply ice, cut the wound, or apply a tourniquet.
- Try to identify the type of snake: note color, size, patterns, and markings.

### 2.3.5 Poison Ivy and Poison Sumac

- Poison ivy, poison oak, and poison sumac typically are found in brush or wooded areas.
- They are more commonly found in moist areas or along the edges of wooded areas.
- Become familiar with the identity of these plants.
- Wear protective clothing that covers exposed skin and clothes.
- Avoid contact with plants and the outside of protective clothing. If skin contacts a plant, wash the area with soap and water immediately.
- If the reaction is severe or worsens, seek medical attention. **SEE ATTACHMENT 8** for more details.

### 2.3.6 Ticks

- Ticks typically are in wooded areas, bushes, tall grass, and brush.
- Project team members should pre-plan for Ticks prior to field events.
  - Order "Bug-Out" suits from the warehouse.
  - Ensure Tick Removal kits are available.
  - Tape ankles, waist and wrists.
- Ticks are black, black and red, or brown and can be up to one-quarter inch in size.
- Wear tightly woven light-colored clothing with long sleeves and pant legs tucked into boots; spray **only** outside of clothing with permethrin or permethrin and spray skin with only DEET; and check yourself frequently for ticks.
- If bitten by a tick, grasp it at the point of attachment and carefully remove it.
- After removing the tick, wash your hands and disinfect and press the bite areas.
- Save the removed tick, call the 1-800 Nurse number and send Tick to laboratory for analysis.
- Complete an Incident Report Form (IRF) found on the Virtual Office.
- Look for symptoms of Lyme disease or Rocky Mountain spotted fever (RMSF).
- Lyme: a rash might appear that looks like a bullseye with a small welt in the center.
- RMSF: a rash of red spots under the skin 3 to 10 days after the tick bite.
- In both cases, chills, fever, headache, fatigue, stiff neck, and bone pain may develop.
- If symptoms appear, seek medical attention.
- **SEE ATTACHMENT 8** for more details.

### 2.3.7 Mosquito Bites

Due to the recent detection of the West Nile Virus in the Southeastern United States it is recommended that **preventative measures** be taken to reduce the probability of being bitten by mosquitoes whenever possible. Mosquitoes are believed to be the primary source for exposure to the West Nile Virus as well as several other types of encephalitis. The following guidelines should be followed to reduce the risk of these concerns for working in areas where mosquitoes are prevalent.

- Stay indoors at dawn, dusk, and in the early evening.
- Wear long-sleeved shirts and long pants whenever you are outdoors.
- Spray clothing with repellents containing permethrin or DEET since mosquitoes may bite through thin clothing.
- Apply insect repellent sparingly to exposed skin. An effective repellent will contain 35% DEET (N,N-diethyl-meta-toluamide). DEET in high concentrations (greater than 35%) provides no additional protection.
- Repellents may irritate the eyes and mouth, so avoid applying repellent to the hands.
- Whenever you use an insecticide or insect repellent, be sure to read and follow the manufacturer's **DIRECTIONS FOR USE**, as printed on the product.

Note: Vitamin B and "ultrasonic" devices are NOT effective in preventing mosquito bites.

#### **Symptoms of Exposure to the West Nile Virus**

Most infections are mild, and symptoms include fever, headache, and body aches, occasionally with skin rash and swollen lymph glands. More severe infection may be marked by headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, paralysis, and, rarely, death. The West Nile Virus incubation period is from 3-15 days. If you have any questions or to report any suspicious symptoms, contact the project Health and Safety Manager.



# 2.4 Radiological Hazards and Controls

Hazards	Controls
None Known	None Required

## 2.5 Contaminants of Concern

(Refer to Project Files for more detailed contaminant information)

Contaminant	Location and Maximum <sup>a</sup> Concentration (ppm)	Exposure Limit <sup>b</sup>	IDLH <sup>c</sup>	Symptoms and Effects of Exposure	PIP <sup>d</sup> (eV)
<b>Benzene</b>	SS: 20 mg/kg (SD-36) SW: 0.0007 mg/l (SWSD-30) GW: 23 mg/l (MW-12S)	1 ppm	500 Ca	Eye, nose, skin, and respiratory irritation; headache; nausea; dermatitis; fatigue; giddiness; staggered gait; bone marrow depression	9.24
<b>Chromium</b>	SS: 3,800 ppm (99 data) GW: 3.59 mg/l (MW-11S)	0.5 mg/ m <sup>3</sup>	250 mg/ m <sup>3</sup>	Irritation to the eyes, skin. Lung fibrosis.	NA
<b>Cadmium</b>	Solid: 58.7 mg/kg	0.005 mg/m <sup>3</sup>	9 Ca	Pulmonary edema, coughing, chest tightness/pain, headache, chills, muscle aches, nausea, vomiting, diarrhea, difficulty breathing, loss of sense of smell, emphysema, mild anemia	NA
<b>DDT-4,4</b>	SS: 8.2 mg/kg (SWSD-32)	1 mg/m <sup>3</sup>			
<b>2,4-Dimethylphenol</b>	GW: 1.5 mg/l (MW-12S)				
<b>Lead</b>	SS: 84.4 mg/kg (SD-36) SW: 0.71 mg/l (SWSD-31) GW: 0.05 mg/l (MW-11S)	0.05 mg/m <sup>3</sup>	100	Weakness lassitude, facial pallor, pal eye, weight loss, malnutrition, abdominal pain, constipation, anemia, gingival lead line, tremors, paralysis of wrist and ankles, encephalopathy, kidney disease, irritated eyes, hypertension	NA
<b>Methyl isobutyl ketone (4-methyl-2-pentanone)</b>	GW: 1.1 mg/l (MW-12S)	NIOSH 50 OSHA 100	500 ppm	Irritation to the eyes, skin, mucous membrane; Headache, narcosis, comma, dermatitis. In animals- liver and kidney damage.	9.3

## 2.5 Contaminants of Concern

(Refer to Project Files for more detailed contaminant information)

Contaminant	Location and Maximum <sup>a</sup> Concentration (ppm)	Exposure Limit <sup>b</sup>	IDLH <sup>c</sup>	Symptoms and Effects of Exposure	PIP <sup>d</sup> (eV)
<b>PNAs (Limits as Coal Tar Pitch)</b> <ul style="list-style-type: none"> <li>- Benzo (g,h,i) perylene</li> <li>- Indeno(1,2,3-cd)pyrene</li> <li>- Benzo(a)pyrene</li> <li>- Benzo(k)fluoranthene</li> <li>- Acenaphthene</li> <li>- Fluorene</li> <li>- Phenanthrene</li> <li>- Anthracene</li> <li>- Pyrene</li> <li>- Benzo (a)anthracene</li> <li>- Chrysene</li> <li>- Benzo(b)fluoranthene</li> <li>- Benzo(k)fluoranthene</li> <li>- Benzo(a)pyrene</li> <li>- 4-Chloro-3Methylphenol</li> </ul>	SS: 36 mg/kg (SD-15) - Benzo(a)anthracene  SW: 0.00066 mg/l (SWSD-32) - benzo(b)fluoranthene	02 mg/m <sup>3</sup>	80 Ca	Dermatitis and bronchitis	UK
<b>Tetrachlorethene</b>	SS: 19 mg/l (SD-36) SW: 0.001 mg/l (SWSD-34) GW: 4.8 mg/l (MW-11S)	1 ppm	100 Ca	Nausea, vomiting, abdominal pain, finger tremors, jaundice, hepatitis, liver tenderness, monocytosis, kidney damage, dermatitis	11.10
<b>Trichloethylene</b>	SS: 76 mg/kg (SD-36) SW: 0.024 mg/l (SWSD-34) GW: 0.047 mg/l (MW-12S)	NIOSH CA OSHA 100ppm C 200 ppm	Ca [1000 ppm]	Irritation to the eyes, skin. Headaches, vertigo. Fatigue, giddiness, tremors, nausea, vomiting, dermatitis, cardiac arrhythmia liver injury. Carcinogen.	9.45
<b>Vinyl chloride</b>	GW: 0.07 mg/l (MW-11S)	NIOSH CA OSHA 1 ppm	CA [N.D.]	Weakness, abdominal pain, Gastrointestinal bleeding, enlarged liver, pallor or cyan of extremities.. Carcinogen.	9.9
<b>Xylenes</b>	SS: 590 mg/kg (SD-36) GW: 0.18 mg/L (MW-17S)	100 ppm	900	Irritated eyes, skin, nose, and throat; dizziness; excitement; drowsiness; incoherence; staggering gait; corneal vacuolization; anorexia; nausea; vomiting; abdominal pain; dermatitis	8.56

## 2.5 Contaminants of Concern

(Refer to Project Files for more detailed contaminant information)

Contaminant	Location and Maximum <sup>a</sup> Concentration (ppm)	Exposure Limit <sup>b</sup>	IDLH <sup>c</sup>	Symptoms and Effects of Exposure	PIP <sup>d</sup> (eV)
<b>Footnotes:</b> <sup>a</sup> Specify sample-designation and media: SB (Soil Boring), A (Air), D (Drums), GW (Groundwater), L (Lagoon), TK (Tank), S (Surface Soil), SL (Sludge), SW (Surface Water). <sup>b</sup> Appropriate value of PEL, REL, or TLV listed. <sup>c</sup> IDLH = immediately dangerous to life and health (units are the same as specified "Exposure Limit" units for that contaminant); NL = No limit found in reference materials; CA = Potential occupational carcinogen. <sup>d</sup> PIP = photoionization potential; NA = Not applicable; UK = Unknown.					

## 2.6 Potential Routes of Exposure

<b>Dermal:</b> Contact with contaminated media. This route of exposure is minimized through proper use of PPE, as specified in Section 4.	<b>Inhalation:</b> Vapors and contaminated particulates. This route of exposure is minimized through proper respiratory protection and monitoring, as specified in Sections 4 and 5, respectively.	<b>Other:</b> Inadvertent ingestion of contaminated media. This route should not present a concern if good hygiene practices are followed (e.g., wash hands and face before drinking or smoking).
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### 3 Project Organization and Personnel

#### 3.1 CH2M HILL Employee Medical Surveillance and Training

(Reference CH2M HILL SOPs HS-113, *Medical Surveillance*, and HS-110, *Health and Safety Training*)

The employees listed below are enrolled in the CH2M HILL Comprehensive Health and Safety Program and meet state and federal hazardous waste operations requirements for 40-hour initial training, 3-day on-the-job experience, and 8-hour annual refresher training. Employees designated "SSC" have completed a 12-hour site safety coordinator course, and have documented requisite field experience. An SSC with a level designation (D, C, B) equal to or greater than the level of protection being used must be present during all tasks performed in exclusion or decontamination zones. Employees designated "FA-CPR" are currently certified by the American Red Cross, or equivalent, in first aid and CPR. At least one FA-CPR designated employee must be present during all tasks performed in exclusion or decontamination zones. The employees listed below are currently active in a medical surveillance program that meets state and federal regulatory requirements for hazardous waste operations. Certain tasks (e.g., confined-space entry) and contaminants (e.g., lead) may require additional training and medical monitoring.

Pregnant employees are to be informed of and are to follow the procedures in CH2M HILL's SOP HS-04, *Reproduction Protection*, including obtaining a physician's statement of the employee's ability to perform hazardous activities before being assigned fieldwork.

Employee Name	Office	Responsibility	SSC/FA-CPR
Juliana Hess	NJO	Project Manager	Not allowed in Exclusion Zone. May not handle samples.
Kevin Flynn	NJO	Project Manager	Not allowed in Exclusion Zone. May not handle samples.
David Reamer	NJO	Site Safety Coordinator & Field Team Leader	Level C SSC/ FA-CPR
Andy Judd	NJO	Geologist & RI Task Lead	Level C SSC
Rachael Kopec	NJO	Scientist	Level C SSC/ FA-CPR
Steve Hoffman	NJO	Scientist	Level C SSC
Matt Germon	BOS	P.E. & FS Task Lead	FA/CPR
Mike Murphy	NJO	Scientist	Level B SSC/ FA-CPR

## 3.2 Field Team Chain of Command and Communication Procedures

### 3.2.1 Client

Contact Name:	<b>Grisell Diaz-Cotto - U.S. Environmental Protection Agency Project Manager</b>
Phone:	<b>212-637-4430</b>

### 3.2.2 CH2M HILL

Project Manager:	<b>Juliana Hess/NJO</b>
Health & Safety Manager:	<b>Steve Beck/MKE</b>
Field Team Leader:	<b>David Reamer/NJO</b>
Site Safety Coordinator:	<b>David Reamer/NJO</b>

The SSC is responsible for contacting the Field Team Leader and Project Manager. In general, the Project Manager will contact the client. The Health and Safety Manager should be contacted as appropriate.

### 3.2.3 CH2M HILL Subcontractors

(Reference CH2M HILL SOP HS-215, *Subcontractor, Contractor, and Owner*)

Subcontractor: TBD Subcontractor Contact Name: Telephone: Subcontractor Task: <b>Surveying</b>	Subcontractor: Subcontractor Contact Name: Telephone: Subcontractor Task: <b>Drilling</b>
Subcontractor: Subcontractor Contact Name: Telephone: Subcontractor Task: <b>Site Clearance</b>	Subcontractor: Subcontractor Contact Name: Telephone: Subcontractor Task: <b>Excavating</b>
Subcontractor: Subcontractor Contact Name: Telephone: Subcontractor Task: <b>Direct Push</b>	Subcontractor: Subcontractor Contact Name: Telephone: Subcontractor Task: <b>Waste Disposal</b>

The subcontractors listed above are covered by this HSP and must be provided a copy of this plan. However, this plan does not address hazards associated with the tasks and equipment that the subcontractor has expertise in (e.g., drilling, excavation work, electrical). Subcontractors are responsible for the health and safety procedures specific to their work, and are required to submit these procedures to CH2M HILL for review before the start of field work. Subcontractors must comply with the established health and safety plan(s). The CH2M HILL SSC should verify that subcontractor employee training, medical clearance, and fit test records are current and must monitor and enforce compliance with the established plan(s). CH2M HILL's oversight does not relieve subcontractors of their responsibility for effective implementation and compliance with the established plan(s).



CH2M HILL should continuously endeavor to observe subcontractors' safety performance. This endeavor should be reasonable, and include observing for hazards or unsafe practices that are both readily observable and occur in common work areas. CH2M HILL is not responsible for exhaustive observation for hazards and unsafe practices. In addition to this level of observation, the SSC is responsible for confirming CH2M HILL subcontractor performance against both the subcontractor's safety plan and applicable self-assessment checklists. Self-assessment checklists contained in Attachment 6 are to be used by the SSC to review subcontractor performance.

Health and safety related communications with CH2M HILL subcontractors should be conducted as follows:

- Brief subcontractors on the provisions of this plan, and require them to sign the Employee Signoff Form included in Attachment 1.
- Request subcontractor(s) to brief the project team on the hazards and precautions related to their work.
- When apparent non-compliance/unsafe conditions or practices are observed, notify the subcontractor safety representative and require corrective action – the subcontractor is responsible for determining and implementing necessary controls and corrective actions.
- When repeat non-compliance/unsafe conditions are observed, notify the subcontractor safety representative and stop affected work until adequate corrective measures are implemented.
- When an apparent imminent danger exists, immediately remove all affected CH2M HILL employees and subcontractors, notify subcontractor safety representative, and stop affected work until adequate corrective measures are implemented. Notify the Project Manager and HSM as appropriate.
- Document all oral health and safety related communications in project field logbook, daily reports, or other records.

## 4 Personal Protective Equipment (PPE)

(Reference CH2M HILL SOP HS-117, *Personal Protective Equipment*, HS-121, *Respiratory Protection*)

### PPE Specifications <sup>a</sup>

Tasks	Level	Body	Head	Respirator <sup>b</sup>
<ul style="list-style-type: none"> <li>General site entry</li> <li>Surveying</li> <li>Utility location</li> <li>Road construction</li> <li>Clearing &amp; grubbing</li> <li>Mechanical installation</li> <li>Monitoring airborne dust</li> <li>Wetland delineation</li> <li>Observation of cleaning of Frac tank</li> <li>Operation of pilot Air Sparge System</li> <li>Observation of material loading for offsite disposal</li> </ul>	D	<b>Coveralls:</b> Work clothes <b>Boots:</b> Steel-toe, leather work boots <b>Gloves:</b> Leather work glove while material handling.	Hardhat <sup>c</sup> Safety glasses Ear protection <sup>d</sup>	None required
<ul style="list-style-type: none"> <li>Surface water sampling</li> <li>Sediment Sampling</li> <li>Aquifer testing</li> <li>Soil sampling</li> </ul>	Modified D	<b>Coveralls:</b> Work clothes or cotton coveralls. Personal Floatation Device (PFD) if potential for drowning exists. <b>Boots:</b> Steel-toe, chemical-resistant boots OR steel-toe, leather work boots with outer rubber boot covers <b>Gloves:</b> Inner surgical-style nitrile gloves.	Hardhat <sup>c</sup> Safety glasses Ear protection <sup>d</sup>	None required
<ul style="list-style-type: none"> <li>Installation of pilot Air Sparge System.</li> <li>LNALP pumping/skimming recovery</li> <li>Groundwater sampling</li> <li>Soil boring</li> <li>Investigation-derived waste (drum) sampling and disposal</li> <li>Test pit excavation</li> </ul>	Modified D	<b>Coveralls:</b> Uncoated Tyvek® <b>Boots:</b> Steel-toe, chemical-resistant boots OR steel-toe, leather work boots with outer rubber boot covers <b>Gloves:</b> Inner surgical-style nitrile & outer chemical-resistant nitrile gloves.	Hardhat <sup>c</sup> Splash shield <sup>c</sup> Safety glasses Ear protection <sup>d</sup>	None required.
<ul style="list-style-type: none"> <li>Tasks requiring upgrade per Air Monitoring specifications outlined in Section 5.1.</li> </ul>	C	<b>Coveralls:</b> Polycoated Tyvek® <b>Boots:</b> Steel-toe, chemical-resistant boots OR steel-toe, leather work boots with outer rubber boot covers <b>Gloves:</b> Inner surgical-style nitrile & outer chemical-resistant nitrile gloves.	Hardhat <sup>c</sup> Splash shield <sup>c</sup> Ear protection <sup>d</sup> Spectacle inserts	APR, full face, MSA Ultratwin or equivalent; with GME-H cartridges or equivalent <sup>e</sup> .
<ul style="list-style-type: none"> <li>Not Authorized.</li> </ul>	B	<b>Coveralls:</b> Polycoated Tyvek® <b>Boots:</b> Steel-toe, chemical-resistant boots OR steel-toe, leather work boots with outer rubber boot covers <b>Gloves:</b> Inner surgical-style nitrile & outer chemical-resistant nitrile gloves.	Hardhat <sup>c</sup> Splash shield <sup>c</sup> Ear protection <sup>d</sup> Spectacle inserts	Positive-pressure demand self-contained breathing apparatus (SCBA); MSA Ultralite, or equivalent.

## Reasons for Upgrading or Downgrading Level of Protection

Upgrade <sup>e</sup>	Downgrade
<ul style="list-style-type: none"> <li>• Request from individual performing tasks.</li> <li>• Change in work tasks that will increase contact or potential contact with hazardous materials.</li> <li>• Occurrence or likely occurrence of gas or vapor emission.</li> <li>• Known or suspected presence of dermal hazards.</li> <li>• Instrument action levels (Section 5) exceeded.</li> </ul>	<ul style="list-style-type: none"> <li>• New information indicating that situation is less hazardous than originally thought.</li> <li>• Change in site conditions that decreases the hazard.</li> <li>• Change in work task that will reduce contact with hazardous materials.</li> </ul>

<sup>a</sup> Modifications are as indicated. CH2M HILL will provide PPE only to CH2M HILL employees.

<sup>b</sup> No facial hair that would interfere with respirator fit is permitted.

<sup>c</sup> Hardhat and splash-shield areas are to be determined by the SSC.

<sup>d</sup> Ear protection should be worn when conversations cannot be held at distances of 3 feet or less without shouting.

<sup>e</sup> Cartridge change-out schedule is at least every 8 hours (or one work day), except if relative humidity is > 85%, or if organic vapor measurements are > midpoint of Level C range (refer to Section 5)—then at least every 4 hours. If encountered conditions are different than those anticipated in this HSP, contact the HSM.

<sup>f</sup> Performing a task that requires an upgrade to a higher level of protection (e.g., Level D to Level C) is permitted only when the PPE requirements have been approved by the HSM, and an SSC qualified at that level is present.

## 5 **Air Monitoring/Sampling**

(Reference CH2M HILL SOP HS-207, *Exposure Monitoring*)

## 5.1 Air Monitoring Specifications

Instrument	Tasks	Action Levels <sup>a</sup>	Frequency <sup>b</sup>	Calibration
PID: MultiRae PID with 11.7eV lamp or equivalent	• All intrusive tasks	Background→ B.G. - 5ppm→ 5-500 ppm →  0-10% :→ 10-25% LEL:→ >25% LEL:→  B.G.-5ppm (H <sub>2</sub> S)→ 5 - 50ppm(H <sub>2</sub> S)→ >50ppm (H <sub>2</sub> S)→	Level D Level C Level B- Not Authorized  No explosion hazard Potential explosion hazard Explosion hazard; evacuate or vent  Level D Level C (PAPR) Level B-Not Authorized	Initially and periodically during task  Daily
CGI: Gem 2000 Plus or equivalent	• Landfill trenching	0-10% :→ 10-25% LEL:→ >25% LEL:→  B.G.-5ppm (H <sub>2</sub> S)→ 5 - 50ppm(H <sub>2</sub> S)→ >50ppm (H <sub>2</sub> S)→	No explosion hazard Potential explosion hazard Explosion hazard; evacuate or vent  Level D Level C (PAPR) Level B-Not Authorized	Continuous during advancement of trench  Daily
CGI: MultiRae or equivalent	• Drilling	0-10% :→ 10-25% LEL:→ >25% LEL:→  B.G.-5ppm (H <sub>2</sub> S)→ 5 - 50ppm(H <sub>2</sub> S)→ >50ppm (H <sub>2</sub> S)→	No explosion hazard Potential explosion hazard Explosion hazard; evacuate or vent  Level D Level C (PAPR) Level B-Not Authorized	Continuous during advancement of boring  Daily
Dust Monitor: Visual	• Drilling • Excavating	Visual Dust→	Utilize Engineering controls (e.g. water or / fans)	Initially and periodically during tasks  Not Applicable
Nose-Level Monitor *: Voice	• Drilling • Excavating • Heavy Equipment Use	Must raise voice and shout to communicate at 3 feet→	Hearing protection required Stop; re-evaluate	Initially and periodically during task  Not Applicable

<sup>a</sup> Action levels apply to sustained breathing-zone measurements above background.

<sup>b</sup> The exact frequency of monitoring depends on field conditions and is to be determined by the SSC; generally, every 5 to 15 minutes if acceptable; more frequently may be appropriate. Monitoring results should be recorded. Documentation should include instrument and calibration information, time, measurement results, personnel monitored, and place/location where measurement is taken (e.g., "Breathing Zone/MW-3", "at surface/SB-2", etc.).

<sup>c</sup> If the measured percent of O<sub>2</sub> is less than 10, an accurate LEL reading will not be obtained. Percent LEL and percent O<sub>2</sub> action levels apply only to ambient working atmospheres, and not to confined-space entry. More-stringent percent LEL and O<sub>2</sub> action levels are required for confined-space entry (refer to Section 2).

<sup>d</sup> Refer to SOP HS-10 for instructions and documentation on radiation monitoring and screening.

<sup>e</sup> Noise monitoring and audiometric testing also required.

## 5.2 Calibration Specifications

(Refer to the respective manufacturer's instructions for proper instrument-maintenance procedures)

Instrument	Gas	Span	Reading	Method
PID: MiniRae PID, 11.7eV bulb	100 ppm isobutylene	CF = 100	100 ppm $\pm$ 5%	1.5 lpm reg T-tubing or Tedlar Bag
CGI: MultiRae	2.5% Methane	N/A	50% LEL $\pm$ 5%	1.5 lpm reg direct tubing, or Tedlar Bag
	25 ppm H <sub>2</sub> S	N/A	25% H <sub>2</sub> S $\pm$ 5%	
	50 ppm CO	N/A	50% CO $\pm$ 5%	
	100 ppm isobutylene	CF = 100	100 ppm $\pm$ 5%	
CGI: Gem 2000 Plus	99% Methane	N/A	99% CH <sub>4</sub> $\pm$ 5%	0.5 lpm reg direct tubing,
	50% CO <sub>2</sub>	N/A	50% CO <sub>2</sub> $\pm$ 5%	
	25 ppm H <sub>2</sub> S	N/A	25% H <sub>2</sub> S $\pm$ 5%	
	50 ppm CO	N/A	50% CO $\pm$ 5%	
	100 ppm isobutylene	CF = 100	100 ppm $\pm$ 5%	

## 5.3 Air Sampling

Sampling, in addition to real-time monitoring, may be required by other OSHA regulations where there may be exposure to certain contaminants. Air sampling typically is required when site contaminants include lead, cadmium, arsenic, asbestos, and certain volatile organic compounds. Contact the HSM immediately if these contaminants are encountered.

### Method Description

Based on historical and previous analytical data, no air sampling will be performed unless conditions change.

### Personnel and Areas

Results must be sent immediately to the HSM. Regulations may require reporting to monitored personnel. Results reported to:

HSM: Steve Beck/MKE

Other: Carl Woods/DAY

## 6 Decontamination

(Reference CH2M HILL SOP HS-506, *Decontamination*)

The SSC must establish and monitor the decontamination procedures and their effectiveness. Decontamination procedures found to be ineffective will be modified by the SSC. The SSC must ensure that procedures are established for disposing of materials generated on the site.

### 6.1 Decontamination Specifications

Personnel	Sample Equipment	Heavy Equipment
<ul style="list-style-type: none"><li>• Boot wash/rinse</li><li>• Glove wash/rinse</li><li>• Outer-glove removal</li><li>• Body-suit removal</li><li>• Inner-glove removal</li><li>• Respirator removal</li><li>• Hand wash/rinse</li><li>• Face wash/rinse</li><li>• Shower ASAP</li><li>• Dispose of PPE in municipal trash, or contain for disposal</li><li>• Dispose of personnel rinse water to facility or sanitary sewer, or contain for offsite disposal</li></ul>	<ul style="list-style-type: none"><li>• Wash/rinse equipment</li><li>• Solvent-rinse equipment</li><li>• Contain solvent waste for offsite disposal</li></ul>	<ul style="list-style-type: none"><li>• Power wash</li><li>• Steam clean</li><li>• Dispose of equipment rinse water to facility or sanitary sewer, or contain for offsite disposal</li></ul>

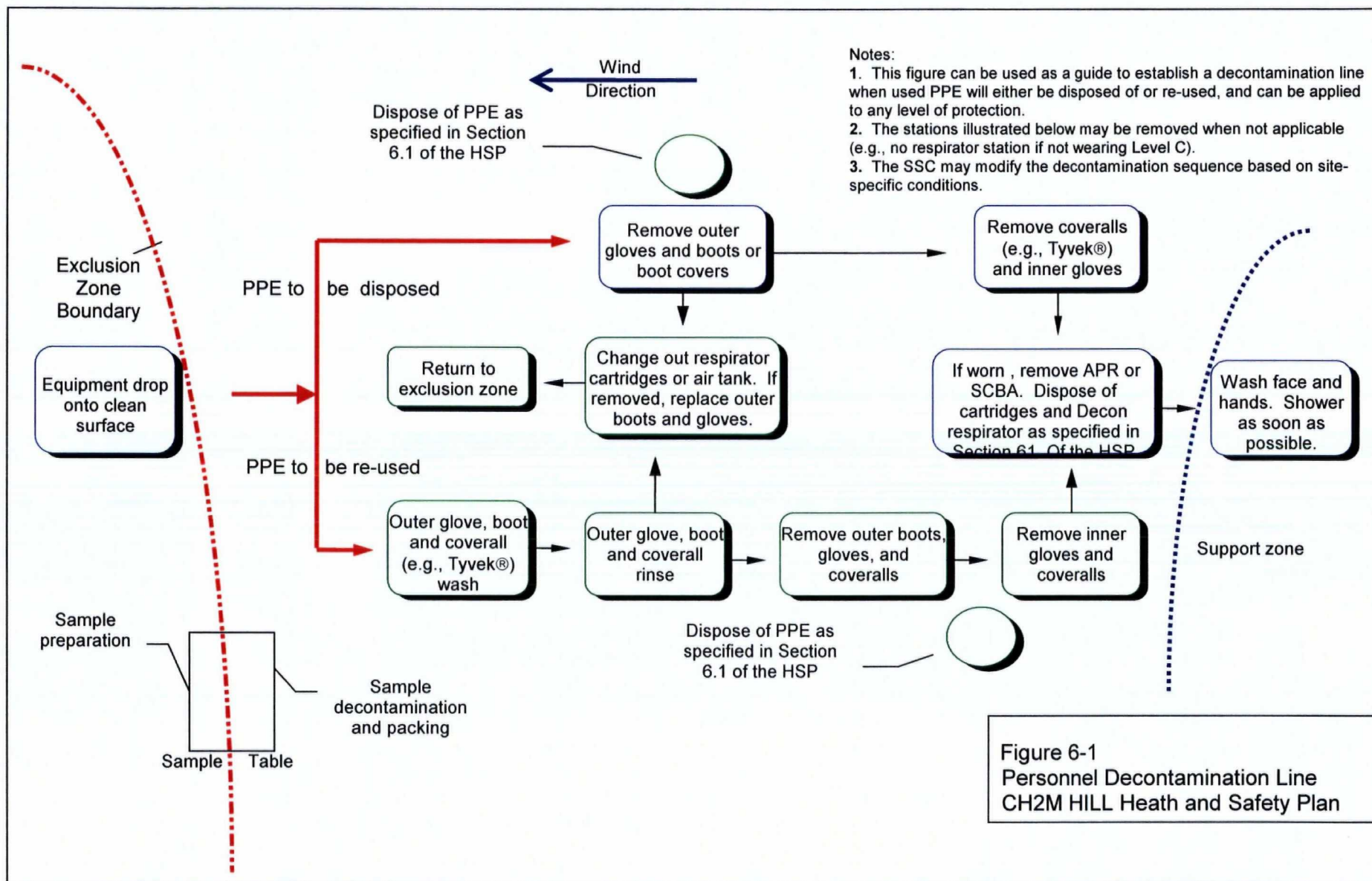
### 6.2 Diagram of Personnel-Decontamination Line

No eating, drinking, or smoking is permitted in contaminated areas and in exclusion or decontamination zones. The SSC should establish areas for eating, drinking, and smoking. Contact lenses are not permitted in exclusion or decontamination zones.

Figure 6-1 illustrates a conceptual establishment of work zones, including the decontamination line. Work zones are to be modified by the SSC to accommodate task-specific requirements.

## 7 Spill-Containment Procedures

Sorbent material will be maintained in the support zone. Incidental spills will be contained with sorbent and disposed of properly.





## 8 Site-Control Plan

### 8.1 Site-Control Procedures

(Reference CH2M HILL SOP HS-510, *Site Control*)

- The SSC will conduct a site safety briefing (see below) before starting field activities or as tasks and site conditions change.
- Topics for briefing on site safety: general discussion of Health and Safety Plan, site-specific hazards, locations of work zones, PPE requirements, equipment, special procedures, emergencies.
- The SSC records attendance at safety briefings in a logbook and documents the topics discussed.
- Post the OSHA job-site poster in a central and conspicuous location in accordance with CH2M HILL SOP HS-71, *OSHA Postings*.
- Establish support, decontamination, and exclusion zones. Delineate with flags or cones as appropriate. Support zone should be upwind of the site. Use access control at entry and exit from each work zone.
- Establish onsite communication consisting of the following:
  - Line-of-sight and hand signals
  - Air horn
  - Two-way radio or cellular telephone if available
- Establish offsite communication.
- Establish and maintain the "buddy system."
- Initial air monitoring is conducted by the SSC in appropriate level of protection.
- The SCC is to conduct periodic inspections of work practices to determine the effectiveness of this plan – refer to Sections 2 and 3. Deficiencies are to be noted, reported to the HSM, and corrected.

### 8.2 Hazwoper Compliance Plan

(Reference CH2M HILL SOP HS-220, *Site-Specific Written Safety Plans*)

Certain parts of the site work are covered by state or federal Hazwoper standards and therefore require training and medical monitoring. Anticipated Hazwoper tasks (Section 1.1.1) might occur consecutively or concurrently with respect to non-Hazwoper tasks. This section outlines procedures to be followed when approved activities specified in Section 1.1.2 do not require 24- or 40-hour training. Non-Hazwoper-trained personnel also must be trained in accordance with all other state and federal OSHA requirements.

- In many cases, air sampling, in addition to real-time monitoring, must confirm that there is no exposure to gases or vapors before non-Hazwoper-trained personnel are allowed on the site, or while non-Hazwoper-trained staff are working in proximity to Hazwoper activities. Other data (e.g., soil) also must document that there is no potential for exposure. The HSM must approve the interpretation of these data. Refer to subsections 2.5 and 5.3 for contaminant data and air sampling requirements, respectively.
- When non-Hazwoper-trained personnel are at risk of exposure, the SSC must post the exclusion zone and inform non-Hazwoper-trained personnel of the:
  - nature of the existing contamination and its locations
  - limitations of their access
  - emergency action plan for the site
- Periodic air monitoring with direct-reading instruments conducted during regulated tasks also should be used to ensure that non-Hazwoper-trained personnel (e.g., in an adjacent area) are not exposed to airborne contaminants.
- When exposure is possible, non-Hazwoper-trained personnel must be removed from the site until it can be demonstrated that there is no longer a potential for exposure to health and safety hazards.
- Remediation treatment system start-ups: Once a treatment system begins to pump and treat contaminated media, the site is, for the purposes of applying the Hazwoper standard, considered a treatment, storage, and disposal facility (TSDF). Therefore, once the system begins operation, only Hazwoper-trained personnel (minimum of 24 hour of training) will be permitted to enter the site. All non-Hazwoper-trained personnel must not enter the TSDF area of the site.

## 9 Emergency Response Plan

(Reference CH2M HILL, SOP HS-106, *Emergency Response*)

### 9.1 Pre-Emergency Planning

The SSC performs the applicable pre-emergency planning tasks before starting field activities and coordinates emergency response with CH2M HILL onsite parties, the facility, and local emergency-service providers as appropriate.

- Review the facility emergency and contingency plans where applicable.
- Determine what onsite communication equipment is available (e.g., two-way radio, air horn).
- Determine what offsite communication equipment is needed (e.g., nearest telephone, cell phone).
- Confirm and post emergency telephone numbers, evacuation routes, assembly areas, and route to hospital; communicate the information to onsite personnel.
- Field Trailers: Post "Exit" signs above exit doors, and post "Fire Extinguisher" signs above locations of extinguishers. Keep areas near exits and extinguishers clear.
- Review changed site conditions, onsite operations, and personnel availability in relation to emergency response procedures.
- Where appropriate and acceptable to the client, inform emergency room and ambulance and emergency response teams of anticipated types of site emergencies.
- Designate one vehicle as the emergency vehicle; place hospital directions and map inside; keep keys in ignition during field activities.
- Inventory and check site emergency equipment, supplies, and potable water.
- Communicate emergency procedures for personnel injury, exposures, fires, explosions, and releases.
- Rehearse the emergency response plan before site activities begin, including driving route to hospital.
- Brief new workers on the emergency response plan.

The SSC will evaluate emergency response actions and initiate appropriate follow-up actions.

### 9.2 Emergency Equipment and Supplies

The SSC should mark the locations of emergency equipment on the site map and post the map.

Emergency Equipment and Supplies	Location
20 LB (or two 10-lb) fire extinguisher (A, B, and C classes)	Support Zone/Heavy Equipment
First aid kit	Support Zone/Field Trailer
Eye Wash	Support & Decon Zone/Field Trailer
Potable water	Support & Decon Zone/Field Trailer
Bloodborne-pathogen kit	Support Zone/Field Trailer

### 9.3 Incident Response

In fires, explosions, or chemical releases, actions to be taken include the following:

- Shut down CH2M HILL operations and evacuate the immediate work area.
- Notify appropriate response personnel.
- Account for personnel at the designated assembly area(s).
- Assess the need for site evacuation, and evacuate the site as warranted.

Instead of implementing a work-area evacuation, note that small fires or spills posing minimal safety or health hazards may be controlled.

## 9.4 Emergency Medical Treatment

The procedures listed below may also be applied to non-emergency incidents. Injuries and illnesses (including overexposure to contaminants) must be reported to Human Resources. If there is doubt about whether medical treatment is necessary, or if the injured person is reluctant to accept medical treatment, contact the CH2M HILL medical consultant. During non-emergencies, follow these procedures as appropriate.

- Notify appropriate emergency response authorities listed in Section 9.8 (e.g., 911).
- The SCC will assume charge during a medical emergency until the ambulance arrives or until the injured person is admitted to the emergency room.
- Prevent further injury.
- Initiate first aid and CPR where feasible.
- Get medical attention immediately.
- Perform decontamination where feasible; lifesaving and first aid or medical treatment take priority.
- Make certain that the injured person is accompanied to the emergency room.
- When contacting the medical consultant, state that the situation is a CH2M HILL matter, and give your name and telephone number, the name of the injured person, the extent of the injury or exposure, and the name and location of the medical facility where the injured person was taken.
- Report incident as outlined in Section 9.7.

## 9.5 Evacuation

- Evacuation routes and assembly areas (and alternative routes and assembly areas) are specified on the site map.
- Evacuation route(s) and assembly area(s) will be designated by the SSC before work begins.
- Personnel will assemble at the assembly area(s) upon hearing the emergency signal for evacuation.
- The SSC and a "buddy" will remain on the site after the site has been evacuated (if safe) to assist local responders and advise them of the nature and location of the incident.
- The SSC will account for all personnel in the onsite assembly area.
- A designated person will account for personnel at alternate assembly area(s).
- The SSC will write up the incident as soon as possible after it occurs and submit a report to the Corporate Director of Health and Safety.

## 9.6 Evacuation Signals

Signal	Meaning
Grasping throat with hand	Emergency-help me.
Thumbs up	OK; understood.
Grasping buddy's wrist	Leave area now.
Continuous sounding of horn	Emergency; leave site now.

## 9.7 Incident Notification and Reporting

- In the event of an emergency, immediately call..... 911.
  - Severe Bleeding
  - Loss of consciousness
  - Chest Pain
  - Broken bones
- All other injuries or illness' (even those that are minor and may only require First Aid) which occur at work, while on business travel or commute must be reported to your supervisor immediately.
- After informing their supervisor, the injured employee calls CH2M HILL's contracted Occupational Nurse.

## **24-hour CH2M HILL Emergency Nurse Assistance**

**800-756-1130**

- The Occupational Injury Nurse listens to the injured employee to understand the injury/illness.
- Employee is provided guidance on appropriate treatment options (triage).
- If instructed to visit a medical facility by the Occupational Nurse, the Supervisor is responsible for instructing the injured employee to take a copy of the **CH2M HILL Initial Medical Treatment Form (Attachment # 8)** with them to the physician, clinic or hospital.
- Appropriate treatment details are handled by the Occupational Injury Nurse, and Workers Compensation Groups.
- Nurse communicates and troubleshoots with and for employee through full recovery.
- Upon any project incident (fire, spill, injury, near miss, death, etc.), immediately notify the PM and HSM. Call emergency beeper number if HSM is unavailable.
- For CH2M HILL work-related injuries or illnesses, contact and help Human Resources administrator complete an Incident Report Form (IRF). IRF must be completed within 24 hours of incident.
- For CH2M HILL subcontractor incidents, complete the Subcontractor Accident/Illness Report Form and submit to the HSM.
- Notify and submit reports to client as required in contract.

### **Additionally:**

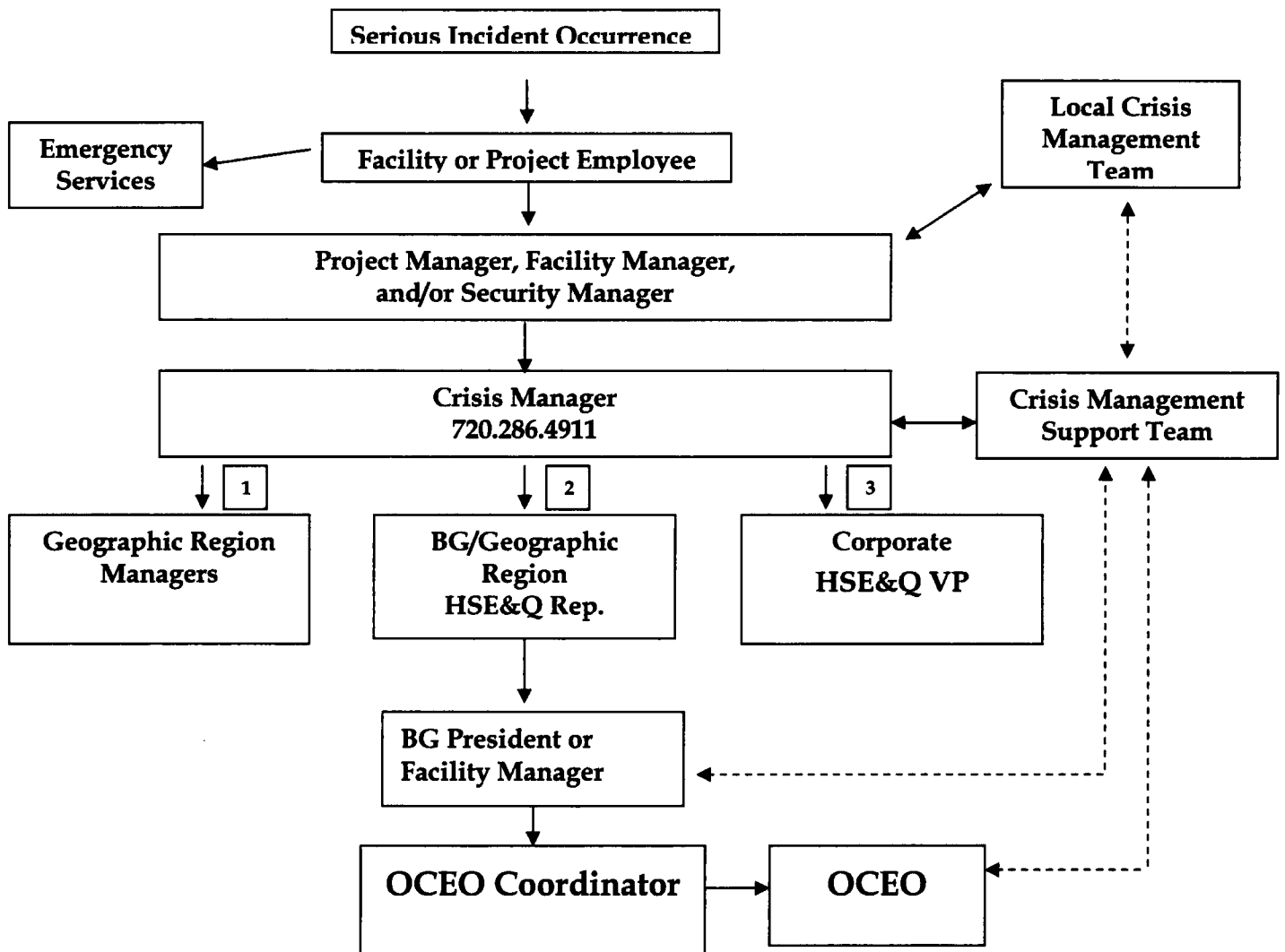
- Upon any project incident (fire, spill, injury, near miss, death, etc.), immediately notify the PM and HSM. Call emergency beeper number if HSM is unavailable.
- For CH2M HILL work-related injuries or illnesses, contact and help Human Resources administrator complete an Incident Report Form (IRF). IRF must be completed within 24 hours of incident.
- For CH2M HILL subcontractor incidents, complete the Subcontractor Accident/Illness Report Form and submit to the HSM.
- Notify and submit reports to client as required in contract.

## **9.8 Serious Incident Reporting**

- Serious Incidents must be reported in accordance with CH2M HILL Standard of Practice HSE-601, *Serious Incident Reporting Process*, immediately. Serious incidents are those that involve any of the following:
  - Work related death, or life threatening injury or illness of a CH2M HILL employee, subcontractor, or member of the public
  - Kidnap/missing person
  - Acts or threats of terrorism
  - Event that involves a fire, explosion, or property damage that requires a site evacuation or is estimated to result in greater than \$ 500,000 in damage.
  - Spill or release of hazardous materials or substances that involves a significant threat of imminent harm to site workers, neighboring facilities, the community or the environment

***Note: See Serious Incident Notification Flow Chart Below!***

# Serious Incident Notification Chart



## Legend:

- Direct line of communication
- ←----- Indirect line of communication

## 10.0 Behavioral Based Loss Prevention

A Behavior-Based Loss Prevention System (BBLPS) has been implemented on this project. BBLPS is a system to prevent or reduce losses using behavior-based tools and proven management techniques to focus on behaviors or acts that could lead to losses.

The four basic loss prevention tools that will be used to implement the BBLPS on this project include:

- Activity Hazard Analysis (AHA)
- Pre-Task Safety Plans (PTSP)
- Safe Work Observations (SWO)
- Loss and Near Loss Investigations (NLI)

The Field Team Leader (FTL) is responsible for implementing the BBLPS on the project site. The Field Team Leader delegates authority to the Site Safety Coordinator (SSC) for the implementation of the BBLPS on the project site, but the FTL remains accountable for its implementation. The SSC shall only oversee the subcontractor's implementation of their AHAs and PTSPs processes on the project.

### 10.1 Activity Hazard Analysis

An AHA defines the activity being performed, the hazards posed, and control measures required to perform the work safely. Workers are briefed on the AHA before doing the work and their input is solicited before, during and after the performance of work to further identify the hazards posed and control measures required.

AHAs will be prepared before beginning each project activity posing health and safety hazards to project personnel using the AHA form provided in Attachment 7. The AHA shall identify the work tasks required to perform each activity, along with potential H&S hazards and recommended control measures for each work task. In addition, a listing of the equipment to be used to perform the activity, inspection requirements and training requirements for the safe operation of the equipment listed must be identified.

An AHA shall be prepared for all field activities performed by CH2M HILL and subcontractors during the course of the project and should be reviewed and accepted by the Health and Safety Manager. The Project-Specific, General and Biological Hazards (the Hazard Analysis Table) and respective applicable CH2M HILL partner standards of practice (SOPs) should be used as a basis for preparing these AHAs.

CH2M HILL subcontractors will be required to provide AHAs specific to their scope of work on the project for acceptance by the Site Safety Coordinator (SSC). Each subcontractor shall submit AHAs for their field activities, as defined in their work plan/scope of work, along with their project-specific HASP. Additions or changes in CH2M HILL or subcontractor field activities, equipment, tools or material to perform work or additional/different hazard encountered that require additional/different hazard control measures requires either a new AHA to be prepared or an existing AHA to be revised.

### 10.2 Pre-Task Safety Plans

Daily safety meetings are held with all project personnel in attendance to review the hazards posed and required health and safety procedures/AHAs that apply for each day's project activities. The PTSPs serve the same purpose as these general assembly safety meetings, but the PTSPs are held between the crew supervisor and their work crews to focus on those hazards posed to individual work crews. At the start of each day's activities, the crew supervisor completes the PTSP, provided in Attachment 8, with input from the work crew, during their daily safety meeting. The day's tasks, personnel, tools and equipment that will be used to perform these tasks are listed, along with the hazards posed and required health and safety procedures, as identified in the AHA. The use of PTSPs better promotes worker participation in the hazard recognition and control process, while reinforcing the task-specific hazard and required health and safety procedures with the crew each day. The use of PTSPs is a common safety practice in the construction industry.

### 10.3 Safe Work Observations

Safe work loss prevention observations (SWOs) shall be conducted by Site Superintendent/SSC for specific work tasks or operations comparing the actual work process against established safe work procedures identified in the project-specific health and safety plan and AHAs. SWOs are a tool to be used by supervisors to provide positive reinforcement for work practices performed correctly, while also identifying and eliminating deviations from safe work procedures that could result in a loss. Site Superintendent/SSC shall perform at least one SWO each week for tasks/operations addressed in the project-specific HASP or AHA. The Site Superintendent/SSC shall complete the SWO form in Attachment 9 for the task/operation being observed, following the process below.

### 10.4 Loss/Near-Loss Investigations

Loss/near-loss investigations shall be performed for the all CH2M HILL and subcontractor incidents involving:

- Person injuries/illnesses and near-miss injuries
- Equipment/property damage
- Spills, leaks, regulatory violations
- Motor vehicle accidents

The causes of loss and near-loss incidents are similar, so by identifying and correcting the causes of near-loss incidents, future loss incidents may be prevented. The following is the loss/near-loss investigation process:

- Gather all relevant facts, focusing on fact-finding, not fault-finding, while answering the who, what, when, where, and how questions.
- Draw conclusions, pitting facts together into a probable scenario.
- Determine incident root causes, which are basic causes on why an unsafe act/condition existed.
- Develop and implement solutions, matching all identified root causes with solutions.
- Communicate incident as a lesson learned to all project personnel.
- File follow-up on implemented corrective active action to confirm solution is appropriate.

Site Supervisors/SSO shall perform an incident investigation, as soon as practical after incident occurrence during the day of the incident, for all loss and near-loss incidents that occur on the project. Loss and near-loss incident investigations shall be performed using the following incident investigation forms provided in Attachment 10:

- Incident Report Form (IRF)
- Incident Investigation Form
- Root Cause Analysis Form

All loss and near-loss incidents involving personal injury, property damage in excess of \$1,000 or near-loss incidents that could have resulted in serious consequences shall be investigated by completing the incident investigation forms and submitting them to the Project Manager and HSM within 24 hours of incident occurrence. A preliminary Incident Investigation and Root Cause Analysis shall be submitted to the Project Manager and HSM within 24 hours of incident occurs. The final Incident Investigation and Root Cause Analysis shall be submitted after completing a comprehensive investigation of the incident.

## 11 Approval

This site-specific Health and Safety Plan has been written for use by CH2M HILL only. CH2M HILL claims no responsibility for its use by others unless that use has been specified and defined in project or contract documents. The plan is written for the specific site conditions, purposes, dates, and personnel specified and must be amended if those conditions change.

### 10.1 Original Plan

Written By: Juliana Hess/NJO

Date: 05/22/2002

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Approved By: Steve Beck

Date: 06/12/2002



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### 10.2 Revisions

Revisions Made By: David Reamer/NJO

Date: 07/17/2007

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**Revisions to Plan:** Inclusion of Phase 2 RI/FS tasks, updated SOP numbers, Included Behavioral Based Loss Prevention (BBLPS), Included new Injury Management protocols, Verified staff training records, Instructed the SSC to acquire Activity Hazard Analysis (AHA) from subcontractors, modified air monitoring section 5.0, Modified PPE Schedule in Section 4.0, Included new Project Specific Forms in Attachment 5, Included additional Self-Assessment Checklists in Attachment 6, Addressed Feral Dogs in the Biological Hazards Section, Added Tick Information.

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Revisions Approved By: Steve Beck

Date: 07/17/2007





## **11 Attachments**

- Attachment 1: Employee Signoff Form**
- Attachment 2: Project-Specific Chemical Product Hazard Communication Form**
- Attachment 3: Chemical-Specific Training Form**
- Attachment 4: Emergency Contacts**
- Attachment 5: Project H&S Forms/Permits**
- Attachment 6: Project Activity Self-Assessment Checklists**
- Attachment 7: Activity Hazard Analysis (AHA) Template**
- Attachment 8: Pre-Task Safety Plan (PTSP)**
- Attachment 9: Safe Work Observation (SWO)**
- Attachment 10: Loss/Near Loss Investigation Form**
- Attachment 11: Initial Medical Intake Form**
- Attachment 12: Biological Hazard Fact Sheet**
- Attachment 13: Material Safety Data Sheets (MSDS)**

**CH2MHILL**  
**HEALTH AND SAFETY PLAN**  
**Attachment 1**

**Employee Signoff Form**

**EMPLOYEE SIGNOFF FORM****Health and Safety Plan**

The CH2M HILL project employees and subcontractors listed below have been provided with a copy of this HSP, have read and understood it, and agree to abide by its provisions.

**Project Name:** Diamond Head Oil Refinery**Project Number:** 359471

<b>EMPLOYEE NAME</b> (Please print)	<b>EMPLOYEE SIGNATURE</b>	<b>COMPANY</b>	<b>DATE</b>

**CH2MHILL**  
**HEALTH AND SAFETY PLAN**  
**Attachment 2**

**Project-Specific  
Chemical Product  
Hazard Communication Form**

## CH2MHILL

### Project-Specific Chemical Product Hazard Communication Form

This form must be completed prior to performing activities that expose personnel to hazardous chemicals products. Upon completion of this form, the SSC shall verify that training is provided on the hazards associated with these chemicals and the control measures to be used to prevent exposure to CH2M HILL and subcontractor personnel. Labeling and MSDS systems will also be explained.

Project Name: Diamond Head Oil Superfund Site

Project Number: 359471

MSDSs will be maintained      Field Trailer  
at the following location(s):

#### Hazardous Chemical Products Inventory

Chemical	Quantity	Location	MSDS Available	Container labels	
				Identity	Hazard
pH Buffer Autocal Solution	< 1 liter	Supoport Zone			
Multi Gas (O <sub>2</sub> , CH <sub>4</sub> , H <sub>2</sub> S, CO, N <sub>2</sub> )	17 liter, compressed	Support Zone			
Multi Gas (CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> )	17 liter, compressed	Support Zone			
Isobutylene	17 liter, compressed	Support Zone			
Hydrochloric acid	< 500 ml	Support Zone / sample bottles			
Nitric acid	< 500 ml	Support Zone / sample bottles / Decon zones			
Carbon Dioxide (Dry Ice)	100 lbs	Support Zone / Exclusion Zone / Sample coolers			
Sodium hydroxide	< 500 ml	Support Zone / sample bottles			
MSA Sanitizer	< 1 liter	Support/Decon Zones			
Alconox/Liquinox	< 1liter	Support/Decon Zones			

Refer to SOP HS-05 *Hazard Communication* for more detailed information.

**CH2MHILL**  
**HEALTH AND SAFETY PLAN**  
**Attachment 3**

**Chemical-Specific Training Form**

**CHEMICAL-SPECIFIC TRAINING FORM****Location:** Diamond Head – Site Office Trailer**Project #:** 359471**HCC:** Dave Reamer/NJO**Trainer:** Dave Reamer/NJO**TRAINING PARTICIPANTS:**

NAME	SIGNATURE	NAME	SIGNATURE

**REGULATED PRODUCTS/TASKS COVERED BY THIS TRAINING:**

General Site Safety Orientation	
Chemical Product Hazcom Inventory (Attach. 2)	

The HCC shall use the product MSDS to provide the following information concerning each of the products listed above.

- ☐ Physical and health hazards
- ☐ Control measures that can be used to provide protection (including appropriate work practices, emergency procedures, and personal protective equipment to be used)
- ☐ Methods and observations used to detect the presence or release of the regulated product in the workplace (including periodic monitoring, continuous monitoring devices, visual appearance or odor of regulated product when being released, etc.)

Training participants shall have the opportunity to ask questions concerning these products and, upon completion of this training, will understand the product hazards and appropriate control measures available for their protection.

Copies of MSDSs, chemical inventories, and CH2M HILL's written hazard communication program shall be made available for employee review in the facility/project hazard communication file.

**CH2MHILL**  
**HEALTH AND SAFETY PLAN**  
**Attachment 4**

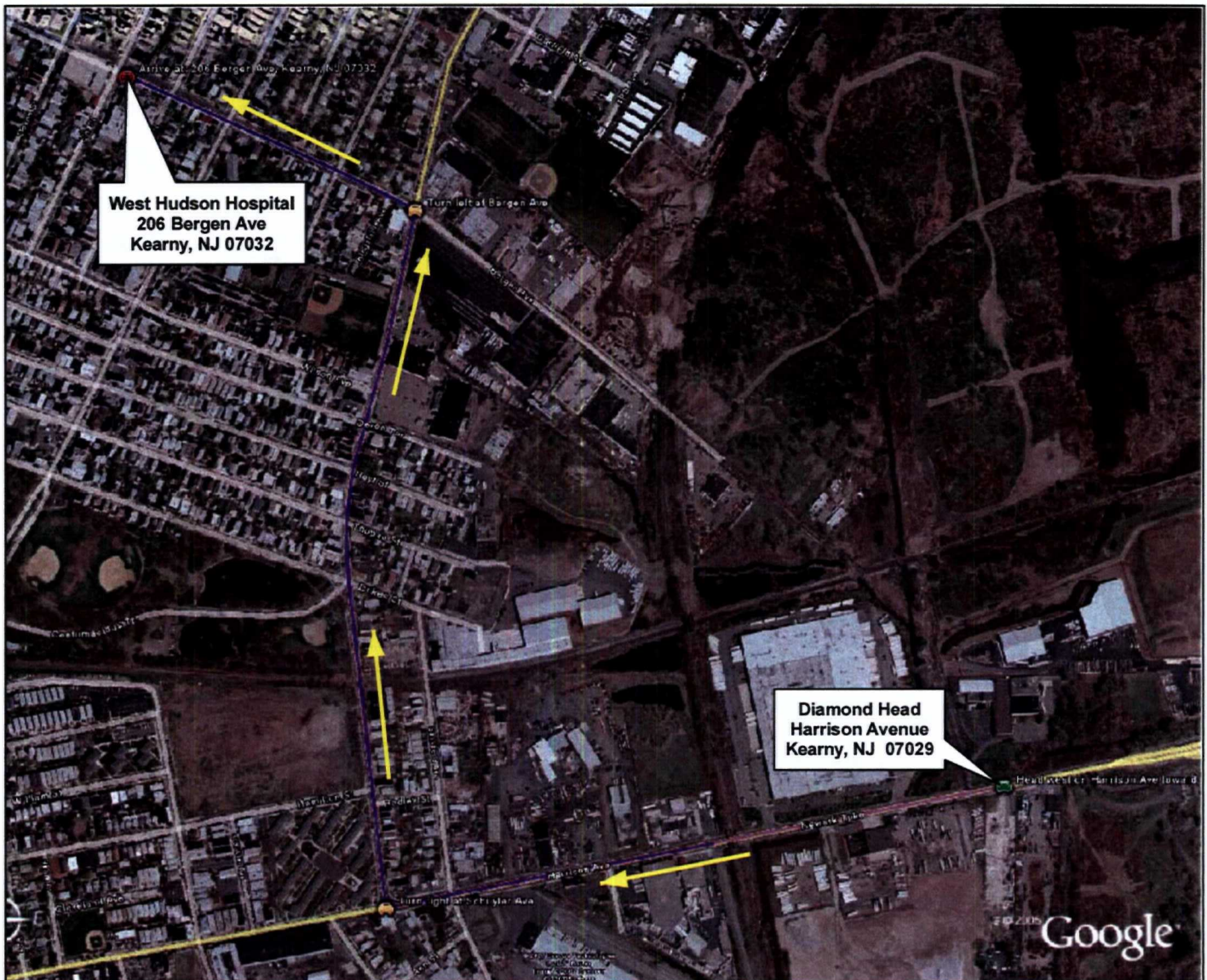
**Emergency Contacts**



## Emergency Contacts

### 24-hour CH2M HILL Emergency Beeper - 888/444-1226

<b>Medical - 911</b>	<b>Medi-T Inc</b> 815 Summer Ave Newark, NJ 07104 Phone: 973-481-4004	<b>CH2M HILL Medical Consultant</b> Health Resources Dr. Jerry H. Berke, M.D., M.P.H. 600 West Cummings Park, Suite 3400 Woburn, MA 01801-6350  1-781-938-4653      or      1-800-350-4511 (After hours calls will be returned within 20 minutes)
<b>Fire/Spill – 911</b>	<b>Kearny Fire Dept</b> 110 Maple St Kearny, NJ 07032 Phone: 201-991-1402	<b>Corporate Director Health, Safety &amp; Environment</b> Name: Keith Christopher/WDC Phone: 1-703-376-5063 <b>24-hour emergency beeper: 888-444-1226</b>
<b>Police - 911</b>	<b>Kearny Police Dept</b> 237 Laurel Ave Kearny, NJ 07032 Phone : 201-998-1313	<b>Regional Health &amp; Safety Program Manager (RHSPM)</b> Name: Steve Beck/MKE Phone: 1-414-847-0277 (direct) Cell: 1-414-526-4517
<b>Safety Coordinator (SC)</b> Name: David Reamer/NJO Phone: 1-908-410-5999		<b>Regional Human Resources Department</b> Name: Cindy Bauder/WDC Phone: 703/471-1441 ext. 4243
<b>Project Manager (PM)</b> Name: Juliana Hess/NJO Phone: 973/316-0159 ext. 4547		<b>Corporate Human Resources Department</b> Name: Pete Hannan/COR Phone: 303/771-0900
<b>Federal Express Dangerous Goods Shipping</b> Phone: 800/238-5355		<b>Worker's Compensation:</b> Contact Regional HR dept. to have form completed or contact Julie Zimmerman after hours: 303/664-3304
<b>CH2M HILL Emergency Number for Shipping Dangerous Goods</b> Phone: 800/255-3924		<b>Automobile Accidents:</b> Rental: Carol Dietz/COR 303/713-2757 CH2M HILL owned vehicle: Zurich Insurance Co. 800/987-3373
Contact the PM. Generally, the PM will contact relevant government agencies.		
<b>Facility Alarms:</b> Horn Blast (3x) from field vehicle		<b>Evacuation Assembly Area(s):</b> At the front gate of the property by Harrison Rd.
<b>Facility/Site Evacuation Route(s):</b> To be determined/communicated to all staff by the Site Safety Coordinator (SCC)		



#### Directions from the Site

From: Vacant lot adjacent to 1235 Harrison Avenue,  
Kearny, NJ 07029-4310, (Hudson County)

To: West Hudson Hospital, 206 Bergen Ave, Kearny, NJ 07032

1. Head west on Harrison Ave
2. Turn right at Schuyler Ave (0.6 mi)
3. Turn left at Bergen Ave (0.3 mi )

Travel Time: Approximately 10 minutes



**CH2MHILL**  
**HEALTH AND SAFETY PLAN**

**Insert Hospital Route Here**

**CH2MHILL**  
**HEALTH AND SAFETY PLAN**  
**Attachment 5**

**Project H&S Forms and Permits**

# CH2MHILL

## EARTHMOVING EQUIPMENT INSPECTION FORM

This form shall be used to document CH2M HILL earthmoving equipment inspections. Earthmoving equipment shall be inspected each day and shift prior to use. All components shall be inspected for damage and proper operation. Any component failing the inspection shall be corrected prior to earthmoving equipment use. Check each box after passing inspection and initial bottom of form each day.

Equipment Name: \_\_\_\_\_ Identification #: \_\_\_\_\_ Week of: \_\_\_\_\_

INSPECTION ITEM	Mon	Tue	Wed	Thu	Fri	Sat	Sun
<b>Visual Checks</b>							
Operating manual - present							
Controls - labeled as to their function, visible and legible, safety latches/guards present							
Tires/tracks - proper inflation/tension, not excessively worn or damaged							
Fluid levels/leaks - engine, transmission, hydraulic, radiator, swing motor and PTO							
Lubrication - to the manufacturer's specifications							
Air filter gauge - gauge is not in the red zone.							
Hydraulics - no fluid leaks, connections tight, hoses, cylinders free of damage.							
Hoses/belts - held securely, not loose or rubbing, no excessive wear or crimping							
Fuel system - tank free of damage, all valves/hoses secure, no leaks							
Body & ground-engaging tools - no damage, cracks, bends, or excessive wear.							
Cylinders/articulation joints- no worn pins, loose connections or other damage.							
Roll-over protective structures (ROPS) - no damage, no cracks or bends							
Seat belt/bar - required unless operator stands or no ROPS							
Handrails, steps, platforms - clean, free from grease, oil, clear of obstructions.							
Cab glass - safety glass, clean, no cracks or visible distortion							
Mirrors - properly adjusted, no cracks or visible distortion							
Windshield wipers, fluid, and defroster - functioning							
Machine guards - present and in good condition							
Fire extinguisher - present and charged							
<b>Operational Checks - check items through normal maneuvers</b>							
Horn & back-up alarm - operating and distinguishable from surrounding noise							
Lights, directional signals, and brake lights - functioning							
Gauges/indicators - visible and working properly							
Operating controls - lift and tilt functioning properly							
Outriggers, if present - functioning properly							
Accelerator - even acceleration, does not stick							
Brakes (service & parking) - brings to complete stop, holds in fixed position							
Steering - responsive, minimal looseness							
Exhaust system - guarded if potential for contact, no signs of sparks/leaks							
<b>Inspector's Initials</b>							

# CH2MHILL

## EXCAVATION PLANNING CHECKLIST

This checklist shall only be used by CH2M HILL when self-performing excavation activities and shall be completed by CH2M HILL excavation competent person during excavation activities. Personnel shall be permitted to enter excavations only after the CH2M HILL Excavation Entry Permit has been completed, authorized by the excavation competent person, and posted at the excavation entrance.

### GENERAL INFORMATION

Project/Site Name: \_\_\_\_\_ Project Number: \_\_\_\_\_  
Name/Location of Excavation: \_\_\_\_\_  
Scope of Work Description: \_\_\_\_\_  
Excavation Depth: \_\_\_\_\_ Excavation Width: \_\_\_\_\_

### PRIOR TO EXCAVATING

- ☐ Personnel meet training and medical surveillance requirements
- ☐ Dig permit obtained, where required by client/facility
- ☐ Client, installation owners, and utility companies contacted for exact location of underground utilities/installations
- ☐ Detection equipment used when exact location of underground utilities is unknown
- ☐ Soils to be excavated have been classified: ☐ Stable Rock ☐ Type A ☐ Type B ☐ Type C
- ☐ Combination, describe: \_\_\_\_\_
- NOTE: If soils unclassified, assume to be Type C**
- ☐ Groundwater table and stormwater run-off evaluated
- ☐ Area evaluated for existence of ordnance explosives (OE) and unexploded ordnance (UXO)

The Environmental Compliance Coordinator (ECC) should be consulted for the following requirements:

- ☐ Soils characterized where contamination may be present
- ☐ USDA (or local equivalent) soil permit obtained for soil transport
- ☐ Excavation evaluated for wetlands, endangered species, cultural/historic resources
- ☐ ACOE/CWA 404 (or local equivalent) permit obtained for wetland areas
- ☐ Stockpile management plan prepared to address national, state, and local regulations
- ☐ Waste discharge/NPDES (or local equivalent) permit obtained for excavation dewatering
- ☐ Storm Water Pollution Prevention or Erosion & Sediment Control Plan prepared, where required

### GENERAL REQUIREMENTS

- ☐ Daily safety briefing/meeting conducted with excavation personnel
- ☐ Guardrails provided on walkways over excavation 6' (1.5 m in Australia) or deeper
- ☐ Barriers provided at excavations 6' (1.5 m in Australia) or deeper when not readily visible
- ☐ Barriers/covers provided for wells, pits, shafts, or similar excavation 6' (1.5 m in Australia) or deeper
- ☐ Earthmoving equipment operated safely (use earthmoving equipment checklist in HS-27)
- ☐ Personnel provided with and wearing appropriate PPE

### EXCAVATING ACTIVITIES

- ☐ Rocks, trees, and other unstable surface objects removed or supported
- ☐ Exposed underground utility lines supported
- ☐ Undermined surface structures supported or determined to be in safe condition
- ☐ Warning system used to remind equipment operators of excavation edge
- ☐ Stockpile covers/liners and excavation silt fences/covers provided, where required (consult ECC)
- ☐ Fugitive dust suppressed

## PROTECTIVE SYSTEMS USE

- ☐ Protective systems used for excavations 5' (1.5 m) or deeper, unless stable rock
- ☐ Protective systems for excavation deeper than 20' (6.1 m) designed by registered PE
- ☐ Protective systems used: ☐ Sloping ☐ Shoring ☐ Trench Box ☐ Combination  
Describe: \_\_\_\_\_
- ☐ Sloping cut to appropriate angle of incline for soil classification (if unclassified, assume Type C soil)
- ☐ Shoring/trench boxes used according to manufacturer recommendations and not subjected to loads exceeding design limits
- ☐ Protective system components securely connected to prevent movement or failure
- ☐ Protective systems inspected daily and free from damage
- ☐ Defective protective systems replaced or corrected
- ☐ Personnel removed from shielding systems when installed, removed, or during vertical movement

## PROTECTIVE SYSTEM REMOVAL and BACKFILLING

- ☐ Protective system removal starts and progresses from excavation bottom
- ☐ Protective systems removed slowly and cautiously
- ☐ Temporary structure supports used if failure of remaining components observed
- ☐ Backfilling taking place immediately after protective system removal
- ☐ Backfill certified clean when required by client or local regulation (consult ECC)

## EXCAVATING AT HAZARDOUS WASTE SITES

- ☐ Waste disposed of according to Health & Safety Plan and RCRA regulations
- ☐ Appropriate decontamination procedures being followed, per Health & Safety Plan

## EXCAVATING AT ORDNANCE EXPLOSIVES SITES

- ☐ OE plan prepared and approved by CH2M HILL UXO Safety Officer
- ☐ OE/UXO avoidance provided, access routes cleared, and boundaries marked prior to excavation
- ☐ Personnel remain inside marked boundary
- ☐ Earthmoving equipment does not excavate closer than 1' (30.5 cm) to anomalies

CH2M HILL Excavation Competent Person Name: \_\_\_\_\_

CH2M HILL Excavation Competent Person Signature: \_\_\_\_\_

Date Completed: \_\_\_\_/\_\_\_\_/\_\_\_\_



# CH2MHILL

## EXCAVATION ENTRY PERMIT

This permit shall only be used by CH2M HILL when self-performing excavation activities and shall be completed by a CH2M HILL excavation competent person. A new permit shall be completed each day authorizing excavation entry. Personnel entering excavations shall verify that a current permit is completed, authorized, and posted at the excavation location prior to entry. Personnel shall exit the excavation and notify the excavation competent person of any unsafe condition or violation of this permit.

Excavations are required to be inspected by an excavation competent person each day, as needed throughout the work shift, and after every rain or other event that could increase the potential for excavation cave-in. This permit shall document that such an inspection has been conducted and that all precautions have been taken to ensure safe entry.

### GENERAL INFORMATION

Project/Site Name: \_\_\_\_\_ Project Number: \_\_\_\_\_

Name/Location of Excavation: \_\_\_\_\_

Scope of Work Description: \_\_\_\_\_

### EXCAVATION ENTRY PRECAUTIONS

- ☐ No tension cracks/fractures or evidence of caving, sloughing, or weak zones observed in soil
- ☐ Precautions taken to prevent surface water from entering excavation
- ☐ Water is not accumulating in excavation
- ☐ When water removal equipment used, it is monitored for proper operation
- ☐ Air monitoring conducted for excavations with hazardous atmospheres potential
- ☐ If hazardous atmosphere, ventilation used to bring conditions to safe level and tested frequently
- ☐ If ventilation unable to bring conditions to safe level, appropriate respiratory protection used
- ☐ Rescue equipment provided where potential for hazardous atmospheres exists
- ☐ Protective systems provided to prevent excavation cave-in
- ☐ Protective systems used: ☐ Benching ☐ Sloping ☐ Shoring ☐ Trench Box ☐ Combination  
Describe: \_\_\_\_\_
- ☐ Protective systems inspected and are free from damage and in stable condition
- ☐ Sloping cut to appropriate angle of incline for soil classification
- ☐ Shoring installed according to design and secured from movement
- ☐ Hydraulic shores maintained at designed pressure
- ☐ Trench boxes not subjected to loads exceeding design limits
- ☐ Vehicular traffic diverted an adequate distance from excavation
- ☐ Spoil piles, equipment, and materials restrained or kept at least 2' (61 cm) from excavation edge
- ☐ Protection provided from material falling/rolling into excavation
- ☐ Safe means of egress provided every 25' (7.6 m) inside excavation
- ☐ Personnel entering excavation briefed and understand planned work and safety precautions
- ☐ Additional precautions taken when entering to repair damaged or unstable protective systems

### ENTRY APPROVAL

CH2M HILL Excavation Competent Person Name: \_\_\_\_\_

CH2M HILL Excavation Competent Person Signature: \_\_\_\_\_

Date/Time Entry Authorized: \_\_\_\_/\_\_\_\_/\_\_\_\_ :\_\_\_\_



## Page 1 of 2

HS-35  
ATTACHMENT 2

# CH2M HILL Confined-Space-Entry Permit

Page 2 of 2

## 6.0 AUTHORIZATION/ACCOUNTABILITY LOG

The following individuals have successfully completed confined space training, have attended a pre-entry briefing, and are authorized to enter the space.

[illegible]

**CH2MHILL**  
**HEALTH AND SAFETY PLAN**  
**Attachment 6**

**Self-Assessment Checklists**

# CH2MHILL

## HS&E Self-Assessment Checklist - DRILLING

Page 1 of 3

This checklist shall be used by CH2M HILL personnel **only** and shall be completed at the frequency specified in the project's HSP.

This checklist is to be used at locations where: 1) CH2M HILL employees are potentially exposed to hazards associated with drilling operations (complete Sections 1 and 3), and/or 2) CH2M HILL oversight of a drilling subcontractor is required (complete entire checklist).

SC may consult with drilling subcontractors when completing this checklist, but shall not direct the means and methods of drilling operations nor direct the details of corrective actions. Drilling subcontractors shall determine how to correct deficiencies and we must carefully rely on their expertise. Items considered to be imminently dangerous (possibility of serious injury or death) shall be corrected immediately or all exposed personnel shall be removed from the hazard until corrected.

Completed checklists shall be sent to the health and safety manager for review.

Project Name: \_\_\_\_\_ Project No.: \_\_\_\_\_

Location: \_\_\_\_\_ PM: \_\_\_\_\_

Auditor: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

This specific checklist has been completed to:

- ☐ Evaluate CH2M HILL employee exposures to drilling hazards
- ☐ Evaluate a CH2M HILL subcontractor's compliance with drilling HS&E requirements

Subcontractors Name: \_\_\_\_\_

- Check "Yes" if an assessment item is complete/correct.
- Check "No" if an item is incomplete/deficient. Deficiencies shall be brought to the immediate attention of the drilling subcontractor. Section 3 must be completed for all items checked "No."
- Check "N/A" if an item is not applicable.
- Check "N/O" if an item is applicable but was not observed during the assessment.

Numbers in parentheses indicate where a description of this assessment item can be found in Standard of Practice HS-204.

### SECTION 1

Yes   No   N/A   N/O

#### **PERSONNEL SAFE WORK PRACTICES (3.1)**

1. Only authorized personnel operating drill rig
2. Personnel cleared during rig startup
3. Personnel clear of rotating parts
4. Personnel not positioned under hoisted loads
5. Loose clothing and jewelry removed
6. Personnel instructed not to approach equipment that has become electrically energized
7. Smoking is prohibited around drilling operation
8. Personnel wearing appropriate PPE, per HSP

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**SECTION 2****Yes No N/A N/O****GENERAL (3.2.1)**

9. Aquifer evaluated for contamination, sole source and wellhead protection
10. Daily safety briefing/meeting conducted with crew
11. Daily inspection of drill rig and equipment conducted before use

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**DRILL RIG PLACEMENT (3.2.2)**

12. Location of underground utilities identified
13. Safe clearance distance maintained from overhead powerlines
14. Drilling pad established, when necessary
15. Drill rig leveled and stabilized

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**DRILL RIG TRAVEL (3.2.3)**

16. Rig shut down and mast lowered and secured prior to rig movement
17. Tools and equipment secured prior to rig movement
18. Only personnel seated in cab are riding on rig during movement
19. Safe clearance distance maintained while traveling under overhead powerlines
20. Backup alarm or spotter used when backing rig

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**DRILL RIG OPERATION (3.2.4)**

21. Kill switch clearly identified and operational
22. All machine guards are in place
23. Rig ropes not wrapped around body parts
24. Pressurized lines and hoses secured from whipping hazards
25. Drill operation stopped during inclement weather
26. Air monitoring conducted per HSP for hazardous atmospheres
27. Rig placed in neutral when operator not at controls

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**DRILL RIG MAINTENANCE (3.2.5)**

28. Defective components repaired immediately
29. Lockout/tagout procedures used prior to maintenance
30. Cathead in clean, sound condition
31. Drill rig ropes in clean, sound condition
32. Fall protection used for fall exposures of 6 feet or greater
33. Rig in neutral and augers stopped rotating before cleaning
34. Good housekeeping maintained on and around rig

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**DRILLING WASTE MANAGEMENT (3.2.6)**

35. Drill cuttings and purge water managed and disposed properly

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

**DRILLING AT HAZARDOUS WASTE SITES (3.2.7)**

36. Waste disposed of according to HSP and RCRA regulations
37. Appropriate decontamination procedures being followed, per HSP

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**FORMS/PERMITS (3.3)**

38. Driller license/certification and drill rig permit obtained
39. Well development/abandonment notifications and logs submitted and in project files
40. Water withdrawal permit obtained, where required
41. Dig permit obtained, where required

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Complete this section for all items checked "No" in Sections 1 or 2. Deficient items must be corrected in a timely manner.**

[illegible]

This checklist shall be used by CH2M HILL personnel **only** and shall be completed at the frequency specified in the project's HSP.

This checklist is to be used at locations where: 1) CH2M HILL employees are potentially exposed to the hazards of earthmoving equipment operations, 2) CH2M HILL employees are operating earthmoving equipment, and/or 3) CH2M HILL provides oversight of a subcontractor operating earthmoving equipment.

The CH2M HILL Safety Coordinator may consult with subcontractors operating earthmoving equipment when completing this checklist, but shall not direct the means and methods of equipment operations nor direct the details of corrective actions. Earthmoving equipment subcontractors shall determine how to correct deficiencies and we must carefully rely on their expertise. Items considered to be imminently dangerous (possibility of serious injury or death) shall be corrected immediately or all exposed personnel shall be removed from the hazard until corrected.

Project Name: \_\_\_\_\_ Project No.: \_\_\_\_\_

Location: \_\_\_\_\_ PM: \_\_\_\_\_

Auditor: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

This specific checklist has been completed to:

- ☐ Evaluate CH2M HILL employee exposures to earthmoving equipment hazards (complete Section 1).
  - ☐ Evaluate CH2M HILL employees operating earthmoving equipment (complete entire checklist).
  - ☐ Evaluate CH2M HILL subcontractor's compliance with earthmoving equipment safety requirements (complete entire checklist).
- Subcontractors Name: \_\_\_\_\_

- Check "Yes" if an assessment item is complete/correct.
- Check "No" if an item is incomplete/deficient. Deficiencies shall be brought to the immediate attention of the earthmoving equipment subcontractor. Section 3 must be completed for all items checked "No."
- Check "N/A" if an item is not applicable.
- Check "N/O" if an item is applicable but was not observed during the assessment.

Numbers in parentheses indicate where a description of this assessment item can be found in Standard of Practice HSE-306.

**SAFE WORK PRACTICES (3.1)****SECTION 1****Yes No N/A N/O**

- |  |                          |                          |                          |                          |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| 1. Personnel maintaining safe distance from operating equipment                                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Positioning personnel in close proximity to operating equipment is avoided                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Personnel wearing high-visibility and/or reflective vests when close to operating equipment | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Personnel approach operating equipment safely   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Personnel riding only in seats of equipment cab and using seat belts                        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Personnel not positioned under elevated portions of equipment                               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Personnel not positioned under hoisted loads  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Personnel not hoisted by equipment  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. Personnel do not to approach equipment that has become electrically energized               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. Personnel wearing appropriate PPE, per HSP.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

<b>EQUIPMENT SAFETY REQUIREMENTS PRIOR TO OPERATING EQUIPMENT (3.2.1)</b>	<b>SECTION 2</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>	<b>N/O</b>
11. Only qualified and authorized personnel operating equipment		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Daily safety briefing/meeting conducted with equipment operators		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Daily inspection of equipment conducted and documented		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Modifications and attachments used approved by equipment manufacturer		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Backup alarm or spotter used when backing equipment		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Operational horn provided on bi-directional equipment		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Seat belts are provided and used		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Rollover protective structures (ROPS) provided		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Braking system capable of stopping full payload		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Headlights and taillights operable when additional light required		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Brake lights in operable condition		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Cab glass provides no visible distortion to the operator		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. All machine guards are in place		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Hauling equipment (dump trucks) provided with cab shield or canopy		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Dump truck beds provided with positive means of support during maintenance or inspection		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Dump truck operating levers provided with latch to prevent accidental dumping		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. Air monitoring conducted per HSP for hazardous atmospheres		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>EQUIPMENT PLACEMENT (3.2.2)</b>					
28. Equipment position on firm/level surface, outriggers used		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Location of underground utilities identified		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Safe clearance distance maintained while working under overhead power lines		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Safe distance is maintained while traveling under power lines		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. Warning system used to remind operator of excavation edge		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Unattended equipment visibly marked at night		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. Tools lowered/parking brake set when not in use, wheels chocked when parked on incline		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>EQUIPMENT OPERATION (3.2.3)</b>					
35. Equipment operated on safe roadways and grades		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. Equipment operated at safe speed		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. Operators maintain unobstructed view of travel path		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. Equipment not operated during inclement weather, lightning storms		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. Equipment started and moved safely		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. Operators keep body parts inside cab during operation		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41. Vehicle occupants in safe position while loading/unloading		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42. Signal person visible to operator when required		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43. Equipment used for hoisting done according to equipment manufacturer specifications		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44. Lifting and hauling capacities are not exceeded		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>EQUIPMENT MAINTENANCE (3.2.4)</b>					
45. Defective components repaired immediately		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
46. Suspended equipment or attachments supported prior to work under or between		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47. Lockout/tagout procedures used prior to maintenance		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
48. Tires on split rims removed using safety tire rack or cage		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
49. Good housekeeping maintained on and around equipment		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>EXCAVATING AT HAZARDOUS WASTE SITES (3.2.5)</b>					
50. Waste disposed of according to HSP.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
51. Appropriate decontamination procedures being followed, per HSP.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



**Complete this section for all items checked "No" in Sections 1 or 2. Deficient items must be corrected in a timely manner.**

**Auditor:** \_\_\_\_\_ **Project Manager:** \_\_\_\_\_  
 HS-35  
 ATTACHMENT 2  
 PAGE 7 OF 3

This checklist shall be used by CH2M HILL personnel **only** and shall be completed at the frequency specified in the project's HSP.

This checklist is to be used at locations where: (1) CH2M HILL employees enter excavations (complete Sections 1 and 3), and/or (2) CH2M HILL oversight of an excavation subcontractor is required (complete entire checklist).

SC may consult with excavation subcontractors when completing this checklist, but shall not direct the means and methods of excavation operations nor direct the details of corrective actions. Excavation subcontractors shall determine how to correct deficiencies and we must carefully rely on their expertise. Conditions considered imminently dangerous (possibility of serious injury or death) shall be corrected immediately or all exposed personnel shall be removed from the hazardous area until corrected.

Project Name: \_\_\_\_\_ Project No.: \_\_\_\_\_

Location: \_\_\_\_\_ PM: \_\_\_\_\_

Auditor: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

This specific checklist has been completed to:

- ☐ Evaluate CH2M HILL employee exposures to excavation hazards  
☐ Evaluate a CH2M HILL subcontractor's compliance with excavation HS&E requirements

Subcontractor Name: \_\_\_\_\_

- Check "Yes" if an assessment item is complete/correct.
- Check "No" if an item is incomplete/deficient. Deficiencies shall be brought to the immediate attention of the excavation subcontractor. Section 3 must be completed for all items checked "No."
- Check "N/A" if an item is not applicable.
- Check "N/O" if an item is applicable but was not observed during the assessment.

Numbers in parentheses indicate where a description of this assessment item can be found in Standard of Practice HSE-307.

**SECTION 1****Yes   No   N/A   N/O****EXCAVATION ENTRY REQUIREMENTS (4.1)**

- |   |                          |                          |                          |                          |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| 1. Personnel have completed excavation safety training                                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Competent person has completed daily inspection and has authorized entry                 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Personnel are aware of entry requirements established by competent person                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Protective systems are free from damage and in stable condition                          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Surface objects/structures secured from falling into excavation                          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Potential hazardous atmospheres have been tested and found to be at safe levels          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Precautions have been taken to prevent cave-in from water accumulation in the excavation | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Personnel wearing appropriate PPE, per HSP.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**SECTION 2**

**GENERAL (4.2.1)**

9. Daily safety briefing/meeting conducted with personnel
10. Excavation and protective systems adequately inspected by competent person
11. Defective protective systems or other unsafe conditions corrected before entry
12. Guardrails provided on walkways over excavation 6' (1.8m) or deeper
13. Barriers provided at excavations 6' or deeper when excavation not readily visible
14. Barriers or covers provided for wells, pits, shafts, or similar excavation 6' (1.8 m) or deeper
15. Earthmoving equipment operated safely (use earthmoving equipment checklist in HS-306)

**Yes No N/A N/O**

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**PRIOR TO EXCAVATING (4.2.2)**

16. Dig permit obtained where required by client/facility
17. Location of underground utilities and installations identified
18. Excavation area evaluated for OE/UXO hazards
19. Soils characterized prior to excavation where contamination may be present
20. USDA (or local equivalent) soil permit obtained for soil transport, where required
21. Excavation area checked for wetlands, endangered species, cultural/historic resources
22. ACOE/CWA 404 (or local equivalent) permit obtained for wetlands, where required
23. Stockpile management plan prepared
24. Waste discharge/NPDES (or local equivalent) permit obtained for excavation dewatering
25. Stormwater pollution prevention or erosion & sediment control plan prepared, where required)

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**EXCAVATING ACTIVITIES (4.2.3)**

26. Rocks, trees, and other unstable surface objects removed or supported
27. Exposed underground utility lines supported
28. Undermined surface structures supported or determined to be in safe condition
29. Warning system used to remind equipment operators of excavation edge
30. Stockpile, excavation covers, liners, silt fences in place, where required
31. Fugitive dust suppressed

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**EXCAVATION ENTRY (4.2.4)**

32. Trenches > 4' (1.2 m) deep provided with safe means of egress within 25' (7.6 m)
33. Structure ramps designed and approved by competent person
34. Potential hazardous atmospheres tested prior to entry
35. Rescue equipment provided where potential for hazardous atmospheres exists
36. Ventilation used to control hazardous atmospheres and air tested frequently
37. Appropriate respiratory protection used when ventilation does not control hazards
38. Precautions taken to prevent cave-in from water accumulation in excavation
39. Precautions taken to prevent surface water from entering excavation
40. Protection provided from falling/rolling material from excavation face
41. Spoil piles, equipment, materials restrained or kept at least 2' (61 cm) from excavation edge

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**EXCAVATION PROTECTIVE SYSTEMS (4.2.5)**

42. Protective systems used for excavations 5' (1.5 m) or deeper, unless stable rock
43. Protective systems for excavation deeper than 20' (6.1 m) designed by registered PE
44. If soil unclassified, maximum allowable slope is 34 degrees
45. Protective systems free from damage
46. Protective system used according to manufacturer's recommendations and not subjected to loads exceeding design limits
47. Protective system components securely connected to prevent movement or failure
48. Cave-in protection provided while entering/exiting shielding systems
49. Personnel removed from shielding systems when installed, removed, or vertical movement

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**SECTION 2 (Continued)****Yes   No   N/A   N/O****PROTECTIVE SYSTEM REMOVAL AND BACKFILLING (4.2.6)**

50. Protective system removal starts and progresses from excavation bottom
51. Protective systems removed slowly and cautiously
52. Temporary structure supports used if failure of remaining components observed
53. Backfilling taking place immediately after protective system removal
54. Backfill certified clean when required by client or local regulation

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**EXCAVATING AT HAZARDOUS WASTE SITES (4.2.7)**

55. Waste disposed of according to HSP and RCRA regulations
56. Appropriate decontamination procedures being followed, per HSP

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**EXCAVATING AT POTENTIAL ORDNANCE EXPLOSIVES SITES (4.2.8)**

57. OE plan prepared and approved
58. OE/UXO avoidance provided, routes and boundaries cleared and marked
59. Personnel remain inside the marked boundary
60. Earthmoving equipment does not excavate closer than 1' (30.5 cm) to anomalies

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



**ACTIVITY HAZARD ANALYSIS (AHA) - TEMPLATE**

<b>Equipment to be used</b> (List equipment to be used in the work activity)	<b>Inspection Requirements</b> (List inspection requirements for the work activity)	<b>Training Requirements</b> (List training requirements including hazard communication)



<b>Activity:</b>	<b>Date:</b>
	<b>Project:</b>
<b>Description of the work:</b>	<b>Site Supervisor:</b>
	<b>Site Safety Officer:</b>
	<b>Review for latest use:</b> Before the job is performed.

<b>Work Activity Sequence</b> (Identify the principal steps involved and the sequence of work activities)	<b>Potential Health and Safety Hazards</b> (Analyze each principal step for potential hazards)	<b>Hazard Controls</b> (Develop specific controls for each potential hazard)



**PRINT NAME**

**SIGNATURE**

**Supervisor Name:** \_\_\_\_\_

\_\_\_\_\_

**Date/Time:** \_\_\_\_\_

**Site Safety Officer:** \_\_\_\_\_

\_\_\_\_\_

**Date/Time:** \_\_\_\_\_

**Employee Name(s):** \_\_\_\_\_

\_\_\_\_\_

**Date/Time:** \_\_\_\_\_

\_\_\_\_\_

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**Date/Time:** \_\_\_\_\_

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\_\_\_\_\_

**Date/Time:** \_\_\_\_\_

**PRE-TASK SAFETY PLAN (PTSP)**

# DAILY PRE-TASK SAFETY PLAN (PTSP)

Project: _____ Location: _____ Date: _____		
Site Safety Officer _____ Job Activity: _____		
Task Personnel: <div style="border-bottom: 1px solid black; height: 15px; margin-bottom: 2px;"></div> <div style="border-bottom: 1px solid black; height: 15px; margin-bottom: 2px;"></div> <div style="border-bottom: 1px solid black; height: 15px; margin-bottom: 2px;"></div> <div style="border-bottom: 1px solid black; height: 15px; margin-bottom: 2px;"></div>		
List Tasks: <div style="border-bottom: 1px solid black; height: 15px; margin-bottom: 2px;"></div> <div style="border-bottom: 1px solid black; height: 15px; margin-bottom: 2px;"></div> <div style="border-bottom: 1px solid black; height: 15px; margin-bottom: 2px;"></div>		
Tools/Equipment/Materials required (ladders, scaffolds, fall protection, cranes/rigging, heavy equipment, power tools, cords, generators, compressed gases, regulated chemical products, etc.): <div style="border-bottom: 1px solid black; height: 15px; margin-bottom: 2px;"></div> <div style="border-bottom: 1px solid black; height: 15px; margin-bottom: 2px;"></div>		
Potential H&S Hazards, including chemical, physical, safety, biological and environmental (Check all that apply):		
<input type="checkbox"/> Chemical burns/contact	<input type="checkbox"/> Trench, excavations, cave-ins	<input type="checkbox"/> Ergonomics
<input type="checkbox"/> Pressurized lines/equipment	<input type="checkbox"/> Overexertion	<input type="checkbox"/> Chemical splash
<input type="checkbox"/> Thermal burns	<input type="checkbox"/> Pinch points	<input type="checkbox"/> Poisonous plants/insects
<input type="checkbox"/> Electrical	<input type="checkbox"/> Cuts/abrasions	<input type="checkbox"/> Eye hazards/flying projectile
<input type="checkbox"/> Weather conditions	<input type="checkbox"/> Spills	<input type="checkbox"/> Inhalation hazard
<input type="checkbox"/> Heights/fall > 6'	<input type="checkbox"/> Overhead Electrical hazards	<input type="checkbox"/> Heat/cold stress
<input type="checkbox"/> Noise	<input type="checkbox"/> Elevated loads	<input type="checkbox"/> Water/drowning hazard
<input type="checkbox"/> Explosion/fire	<input type="checkbox"/> Slips, trip and falls	<input type="checkbox"/> Heavy equipment
<input type="checkbox"/> Radiation	<input type="checkbox"/> Manual lifting	<input type="checkbox"/> Aerial lifts/platforms
<input type="checkbox"/> Confined space entry	<input type="checkbox"/> Welding/cutting	<input type="checkbox"/> Demolition
Other Potential Hazards (Describe): <div style="border-bottom: 1px solid black; height: 15px; margin-bottom: 2px;"></div> <div style="border-bottom: 1px solid black; height: 15px; margin-bottom: 2px;"></div>		

# DAILY PRE-TASK SAFETY PLAN (PTSP)

## Hazard Control Measures (Check all that apply):

<b>PPE</b> <input type="checkbox"/> Thermal/lined <input type="checkbox"/> Eye <input type="checkbox"/> Dermal/hand <input type="checkbox"/> Hearing <input type="checkbox"/> Respiratory <input type="checkbox"/> Reflective vests <input type="checkbox"/> Flotation device	<b>Protective Systems</b> <input type="checkbox"/> Locate buried utilities <input type="checkbox"/> Competent person <input type="checkbox"/> Daily inspections <input type="checkbox"/> Sloping <input type="checkbox"/> Shoring <input type="checkbox"/> Trench box <input type="checkbox"/> Barricades	<b>Fire Protection</b> <input type="checkbox"/> Fire extinguishers <input type="checkbox"/> Fire watch <input type="checkbox"/> Non-spark tools <input type="checkbox"/> Grounding/bonding <input type="checkbox"/> Intrinsically safe equipment <input type="checkbox"/> Combustible materials storage <input type="checkbox"/> Chemical Storage	<b>Electrical</b> <input type="checkbox"/> Lockout/tagout <input type="checkbox"/> Grounded <input type="checkbox"/> Panels covered <input type="checkbox"/> GFCI/extension cords <input type="checkbox"/> Power tools/cord inspected <input type="checkbox"/> Insulated tools/gloves
<b>Fall Protection</b> <input type="checkbox"/> Harness/lanyards <input type="checkbox"/> Adequate anchorage <input type="checkbox"/> Guardrail system <input type="checkbox"/> Covered opening <input type="checkbox"/> Fixed barricades <input type="checkbox"/> Warning system	<b>Air Monitoring</b> <input type="checkbox"/> PID/FID <input type="checkbox"/> Detector tubes <input type="checkbox"/> Radiation <input type="checkbox"/> Personnel sampling <input type="checkbox"/> LEL/O2 <input type="checkbox"/> Other	<b>Proper Equipment</b> <input type="checkbox"/> Aerial lift/ladders/scaffolds <input type="checkbox"/> Forklift/ Heavy equipment <input type="checkbox"/> Backup alarms <input type="checkbox"/> Hand/power tools <input type="checkbox"/> Crane w/current inspection <input type="checkbox"/> Proper rigging <input type="checkbox"/> Operator qualified	<b>Welding &amp; Cutting</b> <input type="checkbox"/> Cylinders secured/capped <input type="checkbox"/> Cylinders separated/upright <input type="checkbox"/> Flash-back arrestors <input type="checkbox"/> No cylinders in CSE <input type="checkbox"/> Flame retardant clothing <input type="checkbox"/> Appropriate goggles
<b>Confined Space Entry</b> <input type="checkbox"/> Isolation <input type="checkbox"/> Air monitoring <input type="checkbox"/> Trained personnel <input type="checkbox"/> Permit completed <input type="checkbox"/> Rescue provisions	<b>Medical/Emerg. Response</b> <input type="checkbox"/> First-aid & BBP kit <input type="checkbox"/> Eye wash <input type="checkbox"/> FA-CPR training <input type="checkbox"/> Route to hospital	<b>Heat/Cold Stress</b> <input type="checkbox"/> Work/rest regime <input type="checkbox"/> Rest area <input type="checkbox"/> Liquids available <input type="checkbox"/> Monitoring <input type="checkbox"/> Training	<b>Vehicle/Traffic</b> <input type="checkbox"/> Traffic Awareness <input type="checkbox"/> Traffic control <input type="checkbox"/> Barricades <input type="checkbox"/> Flags <input type="checkbox"/> Signs
<b>Permits</b> <input type="checkbox"/> Hot work <input type="checkbox"/> Confined space <input type="checkbox"/> Lockout/tagout <input type="checkbox"/> Excavation <input type="checkbox"/> Demolition <input type="checkbox"/> Energized work <input type="checkbox"/> Local/Environmental	<b>Demolition</b> <input type="checkbox"/> Pre-demolition survey <input type="checkbox"/> Structure condition <input type="checkbox"/> Isolate area/utilities <input type="checkbox"/> Competent person <input type="checkbox"/> Hazmat present	<b>Inspections</b> <input type="checkbox"/> Ladders/aerial lifts <input type="checkbox"/> Lanyards/harness <input type="checkbox"/> Scaffolds <input type="checkbox"/> Heavy equipment <input type="checkbox"/> Cranes and rigging <input type="checkbox"/> Other per Field Safety Plan	<b>Training</b> <input type="checkbox"/> Hazwaste <input type="checkbox"/> Construction <input type="checkbox"/> Equipment <input type="checkbox"/> Competent person <input type="checkbox"/> Task-specific (AHA) <input type="checkbox"/> Hazcom

FieldNotes: \_\_\_\_\_

Supervisor signature: \_\_\_\_\_

Date: \_\_\_\_\_

**SAFE WORK OBSERVATION (SWO)**  
**FORM**

Safe Work Observation Form			
Project:		Observer:	
		Date:	
Position/Title of worker observed:		Background Information/ comments:	
Task/Observation _____			
Observed:			
<ul style="list-style-type: none"> <li>• Identify and reinforce safe work practices/behaviors</li> <li>• Identify and improve on at-risk practices/acts</li> <li>• Identify and improve on practices, conditions, controls, and compliance that eliminate or reduce hazards</li> <li>• Proactive PM support facilitates eliminating/reducing hazards (do you have what you need?)</li> <li>• Positive, corrective, cooperative, collaborative feedback/recommendations</li> </ul>			
Actions & Behaviors	Safe	At-Risk	Observations/Comments
Current & accurate Pre-Task Planning/Briefing (Project safety plan, STAC, AHA, PTSP, tailgate briefing, etc., as needed)			<b>Positive Observations/Safe Work Practices:</b>
Properly trained/qualified/experienced			
Tools/equipment available and adequate			
Proper use of tools			<b>Questionable Activity/Unsafe Condition Observed:</b>
Barricades/work zone control			
Housekeeping			
Communication			
Work Approach/Habits			
Attitude			
Focus/attentiveness			<b>Observer's Corrective Actions/Comments:</b>
Pace			
Uncomfortable/unsafe position			
Inconvenient/unsafe location			
Position/Line of fire			
Apparel (hair, loose clothing, jewelry)			
Repetitive motion			<b>Observed Worker's Corrective Actions/Comments:</b>
Other...			

**LOSS/NEAR-LOSS INVESTIGATION**

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## Root Cause Investigation

This attachment is provided to assist in accessing, completing, and reviewing an incident investigation. It is important to remember the following when conducting an investigation:

- Gather relevant facts, focusing on fact-finding, not fault-finding.
- Draw conclusions, pitting facts together into a probable scenario.
- Determine incident root cause(s), the basic causes why an unsafe act/condition existed.
- Develop and implement solutions, matching all identified root causes with solutions.

### Documentation

The following should be included to document the incident.

#### Description

- Provide a description of the event and the sequence of events and actions that took place prior to the incident. Start with the incident event and work backwards in time through all of the preceding events that directly contributed to the incident. The information should identify why the event took place as well as who was involved, when and where the event took place, and what actions were taken.

#### Cause Analysis

Using the form and flowchart in Attachment 1 the root cause of the incident will be determined. This form must be retained in the project and/or regional HS&E files.

**Immediate Causes**— List the substandard actions or conditions that directly affected the incident. The following are examples of immediate causes:

*Substandard Actions:* Operating equipment without authority; failure to warn; failure to secure; operating at improper speed; making safety device inoperable; using defective equipment; failing to use PPE; improper loading; improper lifting; improper position for task; under influence of alcohol or drugs; horseplay.

*Substandard Conditions:* Exposure to hazardous materials; exposure to extreme temperatures; improper lighting; improper ventilation; congestion; exposure to fire and explosive hazard; defective tools, equipment or materials; exposure to extreme noise; poor ventilation; poor visibility; poor housekeeping.

**Basic Causes**— List the personal and job factors that caused the incident. The following are examples of basic causes:

*Personal Factors:* Capability; knowledge; skill; stress; motivation.

*Job Factors:* Abuse or misuse; engineering; maintenance; purchasing; supervision; tools and equipment; wear and tear; work standards.

#### Corrective Action Plan

Include all corrective actions taken or those that should be taken to prevent recurrence of the incident. Include the specific actions to be taken, the employer and personnel responsible for implementing the actions, and a time frame for completion. Be sure the corrective actions address the causes. For example, training may prevent recurrence of an incident caused by a lack of knowledge, but it may not help an incident caused by improper motivation.

The following are examples of management programs that may be used to control future incidents. These programs should be considered when determining specific corrective actions.

*Management Programs:* Accident/incident analysis; emergency preparedness; engineering controls; general promotion; group meetings; health control; hiring and placement; leadership and administration; management training; organizational rules; personal protective equipment; planned inspections; program audits; program controls; purchasing controls; task analysis and procedures; task observation.



## Incident & Near-Loss Investigation Report Form

### Employer Information

Company Name: \_\_\_\_\_

Project Name: \_\_\_\_\_ Task Order: \_\_\_\_\_

Project Location: \_\_\_\_\_

Task Location: \_\_\_\_\_

Job Assignment: \_\_\_\_\_

Preparer's Name: \_\_\_\_\_ Preparer's Employee Number: \_\_\_\_\_

### Incident Specific Information

Date of Incident: \_\_\_\_\_ Time of Incident: \_\_\_\_\_ a.m./p.m.

Location of incident:

☐ Company premises

☐ Field

☐ In Transit

☐ Other: \_\_\_\_\_

Address where the incident occurred: \_\_\_\_\_

Equipment Malfunction : Yes ☐ No ☐

Activity was a Routine Task: Yes ☐ No ☐

Describe any property damage: \_\_\_\_\_

Specific activity the employee was engaged in when the incident occurred: \_\_\_\_\_

All equipment, materials, or chemicals the employee was using when the incident occurred: \_\_\_\_\_

Describe the specific incident and how it occurred: \_\_\_\_\_

Describe how this incident may have been prevented:

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Contributing Factors (Describe in detail why incident occurred):

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Date employer notified of incident: \_\_\_\_\_ To whom reported:

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**Witness Information (First Witness)**

Name: \_\_\_\_\_  
Employee Number \_\_\_\_\_  
Address: \_\_\_\_\_  
City: \_\_\_\_\_  
Zip Code : \_\_\_\_\_  
Phone: \_\_\_\_\_

**Witness Information (Second Witness)**

Name: \_\_\_\_\_  
Employee Number \_\_\_\_\_  
Address: \_\_\_\_\_  
City: \_\_\_\_\_  
Zip Code : \_\_\_\_\_  
Phone: \_\_\_\_\_

Additional information or  
comments: \_\_\_\_\_

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**A ROOT CAUSE ANALYSIS FORM MUST BE COMPLETED FOR ALL INJURIES AND ILLNESSES OR ACTUAL LOSSES.**

**COMPLETION OF THE ROOT CAUSE ANALYSIS FORM FOR NEAR LOSSES IS OPTIONAL, AT THE DISCRETION OF THE HEALTH AND SAFETY MANAGER.**

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# Root Cause Analysis Form

## Root Cause Analysis (RCA)

Root Cause Categories (RCC): In the first column, enter the appropriate RCC from the choices below that applies to the root cause (RC) and/or contributing factor (CF) of the incident. Describe the specific root cause and corrective actions in their respective columns.

1. Lack of skill or knowledge
2. Lack of or inadequate operational procedures or work standards
3. Inadequate communication of expectations regarding procedures or work standards
4. Inadequate tools or equipment
5. Correct way takes more time and/or requires more effort
6. Shortcutting standard procedures is positively reinforced or tolerated
7. Person thinks there is no personal benefit to always doing the job according to standards

RCC #	Root Cause(s)	Corrective Actions	RC <sup>1</sup>	CF <sup>2</sup>	Due Date	Completion Date	Date Verified

<sup>1</sup> RC = Root Cause; <sup>2</sup> CF = Contributing Factors (check which applies)

## Investigation Team Members

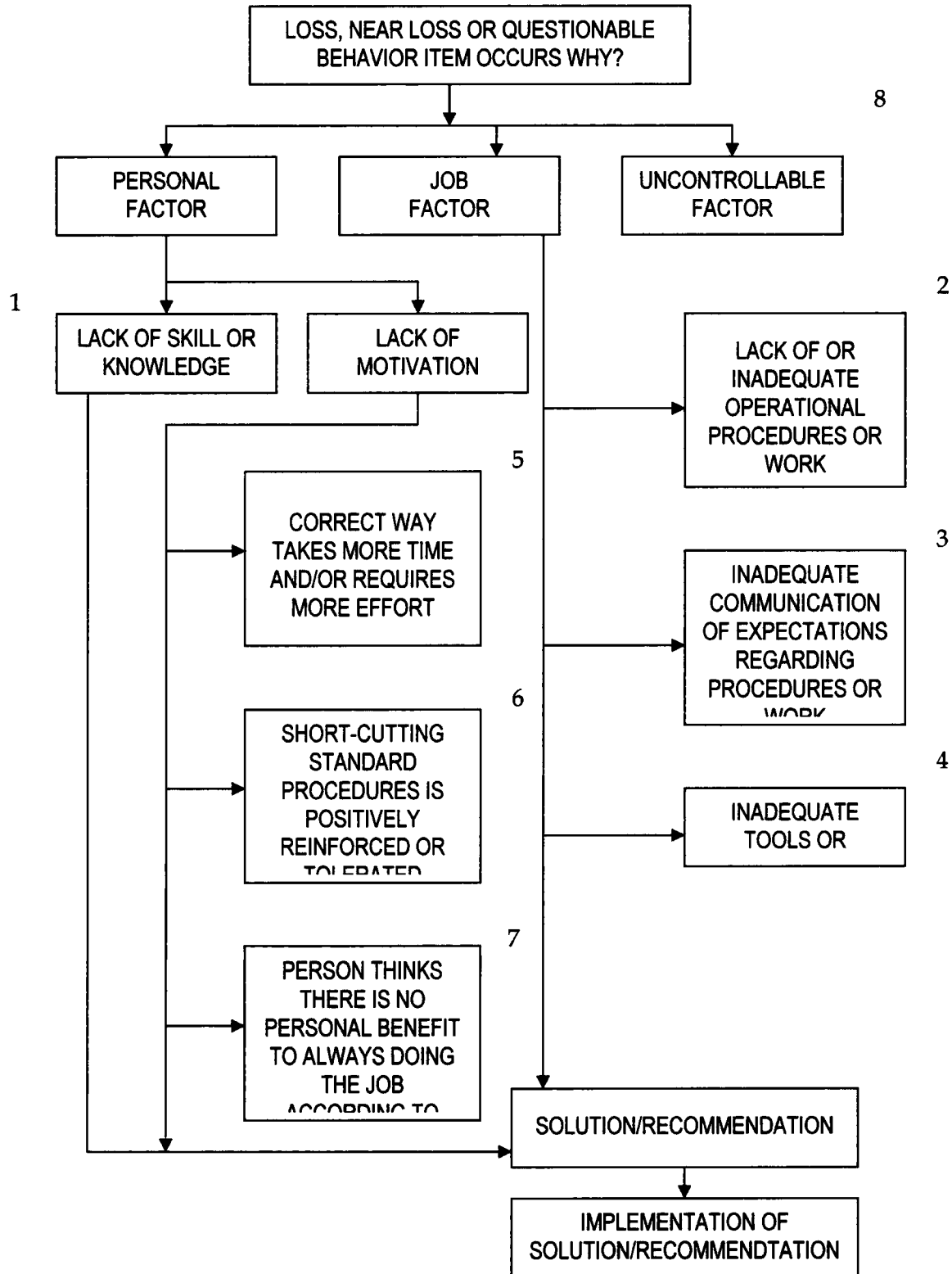
Name	Job Title	Date

## Results of Solution Verification and Validation


## Reviewed By

Name	Job Title	Date

## Root Cause Analysis Flow Chart



**Initial Medical Treatment Form**

## Initial Medical Treatment Form

*To be completed by CH2M HILL Supervisor – Send with employee visiting medical facility or forward within 24 hours.*

Employee name: \_\_\_\_\_

Date of Injury: \_\_\_\_\_

Supervisor: \_\_\_\_\_

HS Representative: \_\_\_\_\_

Visit Authorized by: \_\_\_\_\_

Phone #: \_\_\_\_\_

CH2M HILL Workers Compensation Administrator: Cambridge

Send Bills to: CH2M HILL

Attn: Jennifer Rindahl

P.O. Box 22508

Denver, Colorado 80222-0508

*To be completed by medical provider:*

Physician's name: \_\_\_\_\_ Phone #: \_\_\_\_\_

Address: \_\_\_\_\_

CH2M HILL employee: \_\_\_\_\_ has been treated for: \_\_\_\_\_

**It is the policy of CH2M HILL to provide temporary modified duty whenever possible for employees with physical restrictions resulting from an occupational injury or illness.**

- ☐ Released to full duty
- ☐ Released to restricted duty only (list restrictions below)
- ☐ Out of work until \_\_\_\_\_ (date)

Please list any physical restrictions:

\_\_\_\_\_

Expected duration of restricted duty? \_\_\_\_\_

**CH2M HILL would like the best and most efficient care extended to all our employees. Please recommend over-the-counter (OTC) medication as a suitable alternative when medically feasible.**

☐ Prescribed medication: \_\_\_\_\_

☐ Recommended OTC alternative: \_\_\_\_\_

Date of follow-up appointment: \_\_\_\_\_

Physician's signature: \_\_\_\_\_ Date: \_\_\_\_\_

***Please return this form to the injured employee and FAX to Health Resources at 1-800-853-2641. If you want to discuss the employee's work restrictions, please call the person listed in the "Visit Authorized by" field***

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**CH2MHILL**  
**HEALTH AND SAFETY PLAN**  
**ATTACHMENT 12**

**Biological Fact Sheets**

# Tick-Borne Pathogens

There are 6 notifiable tick-borne pathogens that present a significant field hazard, and in some areas account for more than half of our serious field incidents. These procedures should be applied during any field activity – even those field efforts that are predominantly paved but with bordering vegetation.

## Hazard Control

The methods for controlling exposure to ticks include, in order of most-preferred to least:

- Avoiding tick habitats and ceasing operations in heavily infested areas
- Reducing tick abundance through habitat disruption or application of acaricide
- Personal protection through use of repellants and protective clothing
- Frequent tick inspections and proper hygiene

Vaccinations are not available and preventative antibiotic treatment after a bite is generally not recommended.

## Avoidance and Reduction of Ticks

To the extent practical, tick habitats should be avoided. In areas with significant tick infestation, consider stopping work and withdrawing from area until adequate tick population control can be achieved. Stopping and withdrawing should be considered as seriously as entering an area without proper energy control or with elevated airborne contaminants – tickborne pathogens present risk of serious illness!

In areas where significant population density or infestation exists, tick reduction should be considered. Tick reduction can be achieved by disrupting tick habitats and/or direct population reduction through the use of tick-toxic pesticides (Damminix, Dursban, Sevin, etc.).

Habitat disruption may include only simple vegetative maintenance such as removing leaf litter and trimming grass and brush. Tick populations can be reduced between 72 and 100% when leaf litter alone is removed. In more heavily infested areas, habitat disruption may include grubbing, tree trimming or removal, and pesticide application (Damminix, Dursban, Sevin, etc.). This approach is practical in smaller, localized areas or perimeter areas that require occasional access. Habitat controls are to be implemented with appropriate health and safety controls, in compliance with applicable environmental requirements, and may be best left to the property owner or tenant, or licensed pesticide vendor. Caution should be exercised when using chemical repellents or pesticides in or around areas where environmental or industrial media samples will be collected for analysis.

## Personal Protection

After other prevention and controls are implemented, personal protection is still necessary in controlling exposure to ticks. Personal protection must include all of the following steps:

- So that ticks may be seen on your clothing wear light-colored clothing. Full-body New Tyvek (paper-like disposable coveralls) may also be used.
- To prevent ticks from getting underneath clothing tuck pant legs into socks or tape to boots.
- Wear long-sleeved shirts, a hat, and high boots.
- Apply DEET repellent to exposed skin or clothing per product label.
- Apply permethrin repellent to the outside of boots and clothing before wearing, per product label.
- Frequently check for ticks and remove from clothing.
- At the end of the day search your entire body for ticks (particularly groin, armpits, neck and head) and shower.
- To prevent pathogen transmission through mucous membranes or broken/cut skin, wash or disinfect hands and/or wear surgical-style nitrile gloves anytime ticks are handled.

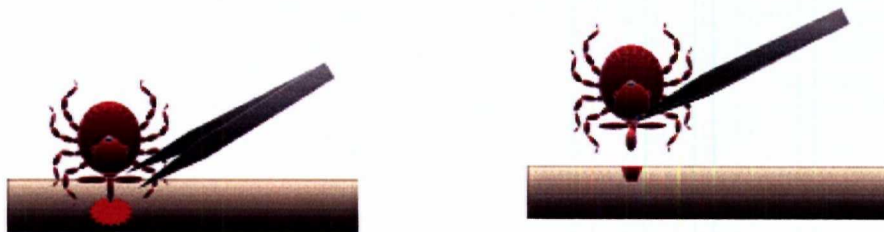
Pregnant individuals and individuals using prescription medications should consult with their physician and/or pharmacists before using chemical repellents. Because human health effects may not be fully known, use of chemical repellents should be kept to a minimum frequency and quantity. Always follow manufacturers' use instructions and precautions. Wash hands after handling, applying, or removing protective gear and clothing. Avoid hand-to-face contact, eating, drinking, smoking, etc. when applying or using repellents. Remove and wash clothes per repellent product label. Chemical repellents should not be used on infants and children.



Vaccinations are generally not available for tick-borne pathogens. Although production of the LYMERix™ lyme disease vaccination has been ceased, vaccination may still be considered under specific circumstances and with concurrence from the consulting physician. Preventative antibiotic treatment in non-ill individuals who have had a recent tick bite is recommended in specific cases only.

## Tick Removal

1. Use fine-tipped tweezers or shield your fingers with a tissue, paper towel, or nitrile gloves.
2. Grasp the tick as close to the skin surface as possible and pull upward with steady, even pressure. Do not twist or jerk the tick; this may cause the mouthparts to break off and remain in the skin. (If this happens, remove mouthparts with tweezers. Consult your healthcare provider if infection occurs.)



3. Do not squeeze, crush, or puncture the body of the tick because its fluids (saliva, hemolymph, gut contents) may contain infectious organisms. Releasing these organisms to the outside of the tick's body or into the bite area may increase the chance of infectious organism transmission.
4. Do not handle the tick with bare hands because infectious agents may enter through mucous membranes or breaks in the skin. This precaution is particularly directed to individuals who remove ticks from domestic animals with unprotected fingers. Children, elderly persons, and immunocompromised persons may be at greater risk of infection and should avoid this procedure.
5. After removing the tick, thoroughly disinfect the bite site and wash your hands with soap and water.
6. You may wish to save the tick for identification in case you become ill. Your doctor can use the information to assist in making an accurate diagnosis. Place the tick in a plastic bag and put it in your freezer. Write the date of the bite on a piece of paper with a pencil and place it in the bag.

**Note:** Folklore remedies such as petroleum jelly or hot matches do little to encourage a tick to detach from skin. In fact, they may make matters worse by irritating the tick and stimulating it to release additional saliva, increasing the chances of transmitting the pathogen. These methods of tick removal should be avoided. In addition, a number of tick removal devices have been marketed, but none are better than a plain set of fine tipped tweezers.

## First-Aid and Medical Treatment

Tick bites should always be treated with first-aid. Clean and wash hands and disinfect the bite site after removing embedded tick. Consult a healthcare professional if infection or symptoms and effects of tick-borne illnesses are develop.

Medical treatment for tick-borne infections include antibiotics and other medical interventions. Diagnosis of specific illness involves both clinical and laboratory confirmations. Preventative antibiotic treatment in non-ill individuals who have had a recent tick bite is recommended in specific cases only.

Previously infected individuals are not conferred immunity – re-infection from future tick bites can occur even after a person has contracted a tick-borne disease.

## Hazard Recognition

An important step in controlling tick related hazards is understanding how to identify ticks, their habitats, their geographical locations, and signs & symptoms of tick-borne illnesses.

## **Tick Identification**

There are five varieties of hard-bodied ticks that have been associated with tick-borne pathogens. These tick varieties include:

- Deer (Black Legged) Tick (eastern and pacific varieties)
- Lone Star Tick
- Dog Tick
- Rocky Mountain Wood Tick

These varieties and their geographical locations are illustrated on the following page.

## **Tick Habitat**

In eastern states, ticks are associated with deciduous forest and habitat containing leaf litter. Leaf litter provides a moist cover from wind, snow, and other elements. In the north-central states, is generally found in heavily wooded areas often surrounded by broad tracts of land cleared for agriculture. On the Pacific Coast, the bacteria are transmitted to humans by the western black-legged (deer) tick and habitats are more diverse. Here, ticks have been found in habitats with forest, north coastal scrub, high brush, and open grasslands. Coastal tick populations thrive in areas of high rainfall, but ticks are also found at inland locations.

## **Illnesses and Signs & Symptoms**

There are six notifiable tick-borne pathogens that cause human illness in the United States. These pathogens may be transmitted during a tick bite – normally hours after attachment. The illnesses, presented in approximate order of most common to least, include:

- Lyme (bacteria)
- RMSF (bacteria)
- Ehrlichiosis (bacteria)
- STARI (Southern Tick-Associated Rash Illness) (bacteria)
- Tularemia (Rabbit Fever) (bacteria)
- Babesia (protozoan parasite)

Symptoms will vary based on the illness, and may develop in infected individuals typically between 3 and 30 days after transmission. Some infected individuals will not become ill or may develop only mild symptoms. These illnesses present with some or all of the following signs & symptoms: fever, headache, muscle aches, stiff neck, joint aches, nausea, vomiting, abdominal pain, diarrhea, malaise, weakness, small solid, ring-like, or spotted rashes. The bite site may be red, swollen, or develop ulceration or lesions. A variety of long-term symptoms may result when untreated, including debilitating effects and death.





Deer Tick



From Left: adult female, adult male, nymph, and larvae Deer Tick (cm scale)



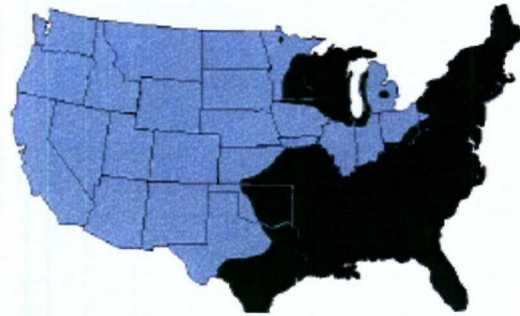
Lone Star Tick



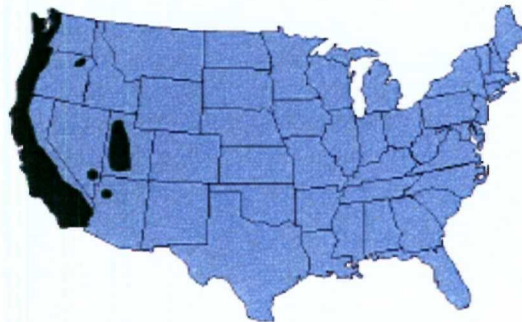
Dog Tick



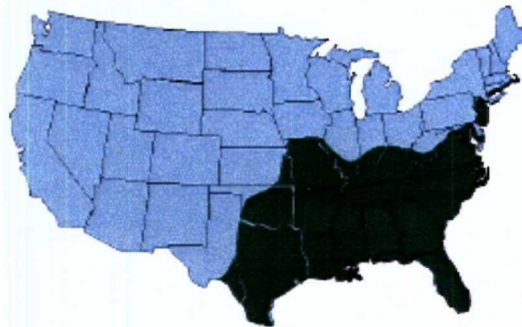
Rocky Mountain Wood Tick



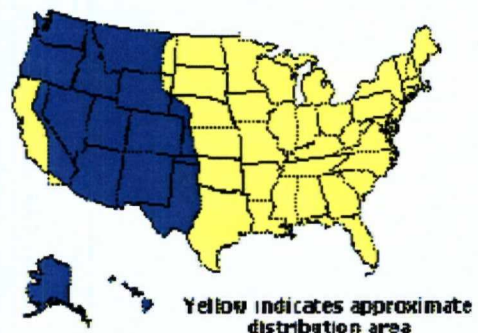
Distribution of Deer Tick (dark green)



Distribution of Pacific Deer Tick (dark green)



Distribution of Lone Star Tick (Green)



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## Poison Oak, Ivy and Sumac

Poison oak, ivy and sumac plants are the single most common cause of allergic skin reactions in the United States. They are caused by contact with urushiol (you-ROO-shee-ol), which is found in the sap of the plants. It is colorless or pale yellow oil that oozes from any cut or crushed part of the plant, including the roots, stems and leaves. The oil is active year round. Reaction to Poison Oak, Ivy, and Sumac ranges from no reaction to a severe "rhus" dermatitis. Rhus is the class of poisonous plants which includes poison oak, poison ivy, poison sumac, mango, and other urushiol containing plants. 3 of 4 people will develop dermatitis on contact with urushiol.

Contact with urushiol can occur in three ways: direct, indirect and airborne particles. Direct contact is touching the sap of the toxic plant, while indirect contact involves touching something which has urushiol on it, such as personal protective equipment (PPE), clothes, boots, field equipment, or any items that have come in contact with the plant (including your hands). Airborne urushiol particles, such as burning plants or spray from a weed whacker, may also contact the skin or be inhaled, causing internal inflammation.

The rash caused by urushiol can affect almost any part of the body, especially where the skin is thin, such as the face. The rash does not spread, although it may seem to when it breaks out in new areas. Actually, what happens is the urushiol absorbs more slowly into thicker skin, such as found on the forearms, legs and trunk.

## Identification

### Poison Oak

Poison oak shrubs are usually 12" to 30" high, or a tree-climbing vine, with triple leaflets and short, smooth hair underneath. A project site in Portland had 8' tall poison oak bushes. Early berries are fuzzy and white; later, dun-colored. Plants are red and dark green in Spring and Summer, with yellowing leaves anytime especially in dry areas. Leaves may achieve bright reds in Fall, but the plant loses its (yellowed, then brown) leaves in Winter, leaving toxic stems. All parts of the plant remain toxic throughout the seasons.

### Poison Ivy

Poison ivy plants are frequently found around lakes and streams in the Midwestern and the Eastern parts of the United States and are commonly found growing along trails and roadsides. Poison ivy grows as a woody, ropelike vine that can grow along fences or up trees, a trailing shrub on the ground, or a free-standing shrub. It normally has three leaflets (groups of leaves all on the same small stem coming off the larger main stem), but may vary from groups of three to nine. Poison ivy leaves are green in the summer and red in the fall with yellow or green flowers and white berries.

### Poison Sumac

Poison sumac plants grow in boggy areas, especially in the Southeastern United States. Typically, poison sumac grows as a rangy shrub up to 15 feet tall. The plants are found to have seven to 13 smooth-edged leaflets and can have glossy pale yellow or cream-colored berries.

Primary contamination from poison oak, ivy or sumac, results from contact with bruised or broken plant parts that release "toxicodendrol", an oily resin containing the toxic chemical "urushiol".



Poison Ivy



Poison Sumac



Poison Oak

## Exposure

Exposure to poison oak, ivy or sumac often becomes an OSHA recordable illness. The dermatitis is so severe that many people seek medical care and get prescription cortisone creams to reduce the suffering caused by the itch. If exposed, refer to the CH2M HILL HSE&Q Injury and Illness Reporting brochure for proper action to take if contaminated.

1. Identify plants containing urushiol – The best way to prevent exposure is to recognize the plant and avoid working in areas where poison oak, ivy or sumac is present.
2. If you must work in areas with urushiol containing plants, contact you project manager and health and safety manager to determine the best procedures to prevent contamination.
3. Contamination with poison oak, ivy or sumac can happen through several pathways. These include
  - Direct skin contact with any part of the plant.
  - Contact with clothing that has been contaminated
  - Contact from removing shoes that have been contaminated. (your shoes are coated with oil)
  - Sitting in a vehicle that has become contaminated
  - Contact with any objects or tools that have become contaminated.

## Best Work Practices

If you must work on a site that has been identified to contain poison oak, ivy or sumac, the following precautions are necessary:




Do not drive vehicles onto the site where it will come into contact with poison oak, ivy or sumac. Vehicles which need to work in the area, such as drill rigs or heavy equipment must be washed and decontaminated as soon as possible after leaving the site.




All tools used in the area, including those used to cut back the plants, surveying instruments used in the area, air monitoring equipment or other test apparatus must be decontaminated before they are placed back into the site vehicle. If on-site decontamination is not possible, use plastic to wrap any tools or equipment until they can be decontaminated. If working on or near the ground surface, place plastic on the ground to cover the grass and foliage.







Personal protective equipment (PPE), including tyvek coveralls, gloves, and boot covers must be worn. PPE and plastic used to cover the ground must be placed into separate plastic bags and sealed if they are not disposed immediately into a trash receptacle.



Shower as soon as possible to remove any potential contamination. Any body part with suspected or actual exposure should be washed with "Tecnu" or other product designed for removing urushiol. If you do not have Tecnu wash with cold water. Do not take a bath, as the oils can form an invisible film on top of the water and contaminate your entire body upon exiting the bath.



Zanfel™ may also be used to treat exposed areas that are experiencing signs and symptoms of poison oak, ivy or sumac contamination. The CH2M HILL warehouses carry Zanfel™ products, which must be carried in First Aid Kits as deemed appropriate. Refer to the Zanfel™ information guide below for specific product and contact information.



Use products such as IvyBlock™ to prevent poison oak, ivy and sumac contamination. IvyBlock™ is approved by the FDA to prevent the rash caused by poison oak, ivy and sumac.

If there is exposure use the following first aid procedures, or others you may find to alleviate the pain and itching.



## Poison Oak, Ivy, and Sumac First Aid

<p><b>Are there any of these problems?</b></p> <ul style="list-style-type: none"> <li>• Swelling in the throat, tongue and/or lips</li> <li>• A hard time breathing or swallowing</li> <li>• Weakness, dizziness</li> <li>• Bluish lips and mouth</li> <li>• Unconsciousness</li> </ul> <p><b>NO</b></p>	<p><b>YES</b></p> <p><b>Give First Aid</b></p> <p><b>Seek Emergency Care</b></p> <p><b>Use emergency kit with adrenalin, if available, and Get Emergency Care.</b></p>
<p><b>Do you have any of these problems?</b></p> <ul style="list-style-type: none"> <li>• Skin that is very bright red.</li> <li>• Pus.</li> <li>• Rash that has spread to the mouth, eyes or genitals.</li> <li>• Rash on large areas of the body or the face.</li> </ul> <p><b>NO</b></p>	<p><b>YES</b></p> <p><b>Give First Aid</b></p> <p><b>See Doctor</b></p> <p><b>Give first aid before seeing doctor:</b></p> <ul style="list-style-type: none"> <li>• Take a hot shower (only after rash develops), put the rash area in hot water or pour hot water over it. Make sure the water is not too hot to burn the skin. The hot water causes itching at first, but brings relief later. Do not use soap.</li> <li>• Take an over-the-counter antihistamine, such as Benadryl, as stated on the label.</li> <li>• For weeping blisters:</li> <li>• Mix 2 teaspoons of baking soda in 1 quarter (4 cups) of water.</li> <li>• Dip squares of gauze in this mixture.</li> <li>• Cover the blisters with the wet gauze for 10 minutes, four times a day. (Do not apply this to the eyes.)</li> </ul>
<p><b>Provide Self-Care</b></p>	

## Urushiol Plant Facts

### Urushiol Oil is Potent

- Only 1 nanogram (billionth of a gram) needed to cause rash
- Average is 100 nanograms for most people
- 1/4 ounce of urushiol is all that is needed to cause a rash in every person on earth
- 500 people could itch from the amount covering the head of a pin
- Specimens of urushiol several centuries old have found to cause dermatitis in sensitive people.
- 1 to 5 years is normal for urushiol oil to stay active on any surface including dead plants
- Derived from **urushi**, Japanese name for lacquer

Myth 	Fact 
Poison oak, ivy, and sumac are contagious	Rubbing the rashes won't spread poison ivy to other parts of your body (or to another person). You spread the rash only if <b>urushiol oil</b> -- the sticky, resinlike substance that causes the rash -- has been left on your hands.
You can catch poison ivy simply by being near the plants	Direct contact is needed to release <b>urushiol oil</b> . Stay away from forest fires, direct burning, or anything else that can cause the oil to become airborne such as a lawnmower, trimmer, etc.
Leaves of three, let them be	Poison sumac has 7 to 13 leaves on a branch, although poison ivy and oak have 3 leaves per cluster
Do not worry about dead plants	<b>Urushiol</b> oil stays active on any surface, including dead plants, for up to 5 years.
Breaking the blisters releases <b>urushiol</b> oil that can spread	Not true. But your wounds can become infected and you may make the scarring worse. In very extreme cases, excessive fluid may need to be withdrawn by a doctor.

## New Cream to Treat Exposure to Poison Plants

Exposure to poison oak, ivy and sumac can be uncomfortable, and in some cases the rash can become so severe that medical care is required. A new product is available Zanafel™ ([www.zanafel.com](http://www.zanafel.com)) that helps prevent blistering and itching from becoming severe. If you are working in an area with poison oak, ivy or sumac, you can obtain this cream by contacting your regional Safety Program Assistants (SPAs):

**SWR: Julie Yeager/SAC**

**NER: Lynn Bong/MKE**

**NWR: Charla Vrcoth/SEA**

**SER: Jerry Weeks/GNV**

**CNR: Katherine Morra/TOR**

Please remember, the cream does not replace preventative measures, including:

- Avoiding contact with poison oak, ivy and sumac.
- Wearing Tyvek coveralls and gloves to prevent contact.
- Washing with Tecnu® (or a similar product) after potential exposure.
- Washing clothing and decontaminating equipment with an oil-cutting detergent.



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**More information about Zanafel (from Zanafel):**

Zanafel™ is an effective wash for urushiol-induced contact dermatitis. Urushiol is the toxin known to cause the itching and rash associated with poison oak, ivy, sumac, poisonwood, and related plants. Zanafel works by surrounding urushiol and bonding with it, thereby enabling it to be rinsed away. Unlike some products that require use within 10-20 minutes of contact or that required continued use until the rash is gone (which can take up to 5 weeks), Zanafel offers relief at any stages of the reaction and often with only one wash. Individuals with particularly severe reactions may require additional washes. Most individuals experience relief from the itching within 30 seconds of application. The rash will begin to subside within hours if the reaction is mild to moderate. Severe and systemic cases will still require medical attention. Severe cases are defined as breakouts that are present on more than 15-percent of the body, and new breakouts continue to develop after day 4.

**Material Safety Data Sheets**

**(To be inserted by SSC after taking Chemical Inventory)**